Ontario

FOREST INFORMATION MANUAL

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FOREWORD

The *Policy Framework for Sustainable Forests*

The *Policy Framework for Sustainable Forests* provides the overall context for forest management in Ontario by setting the broad direction for forest policy and making forest sustainability the primary objective of forest management.

Overview of the *Crown Forest Sustainability Act*

The *Crown Forest Sustainability Act*, which replaced the *Crown Timber Act*, came into effect on April 1, 1995. The *Crown Forest Sustainability Act* is enabling legislation that provides for the regulation of forest planning, information, operations, licensing, trust funds, processing facilities, remedies and enforcement, and transitional provisions. The *Crown Forest Sustainability Act* is designed to allow for the management of all forest-based values.

The *Crown Forest Sustainability Act* defines the term *sustainability* as long-term Crown forest health. The approach to the determination of sustainability is described in the *Forest Management Planning Manual*. This approach requires the development of objectives and measurable targets for desired benefits in order to achieve desired future conditions. It also requires the development and implementation of strategies to achieve those objectives and targets. Finally, monitoring and evaluation of future forest conditions to compare with planned outcomes provide a means for continual refinement, redevelopment, and improvement of forest management strategies. Related information and operational direction is contained in the *Forest Information Manual* and the *Forest Operations and Silviculture Manual*.

Implementation of the Crown Forest Sustainability Act Through the Development of Manuals

The *Crown Forest Sustainability Act* requires the provision of four manuals to guide various aspects of forest management in Ontario. These manuals are prepared in accordance with Section 68. of the Act and are regulated in accordance with Section 69.(1) 29. They are:

1. The *Forest Management Planning Manual*
2. The *Forest Information Manual*
3. The *Forest Operations and Silviculture Manual*
4. The *Scaling Manual*

The *Forest Management Planning Manual* is the pivotal document which provides direction for all aspects of forest management planning for Crown lands in Ontario. This manual was developed by the Ministry of Natural Resources, in collaboration with non-government organizations, during 1994 and 1995. Forest management plans provide the authority to carry out forest management activities including road access, timber harvest, and forest renewal, tending, and protection treatments.

The *Forest Information Manual* describes the roles and responsibilities of forest resource licence holders and the Ministry of Natural Resources to provide and exchange information and information products for the purpose of forest management planning or to ensure compliance with the *Crown Forest Sustainability Act* and its regulations. This manual describes the requirements, standards, roles and responsibilities, timelines, conditions, and technical specifications for providing information and information products. Much of the content of the *Forest Information Manual* has been set by the planning and operational requirements described in the *Forest Management Planning Manual*.

The *Forest Operations and Silviculture Manual* provides guidance and direction for the conduct of operations authorized by approved forest management plans. This manual provides for the qualification of persons engaged in forest operations, as well as measures for assessing the performance of forest operations.

The *Scaling Manual* provides direction for the measurement of all timber harvested from Crown land in Ontario. It provides the means through which Ontario collects revenue from the disposition of Crown timber.

Revisions to the Manuals

The four manuals will always be "works in progress". They will be revised, improved, and updated based on experiences in using the manuals, and as new information becomes available. Revisions to the four manuals will be made through consultation with non-government organizations and the Provincial Technical Committee.

PREFACE

The Ministry of Natural Resources is pleased to introduce the *Forest Information Manual*, the last of four regulatory manuals prescribed by the *Crown Forest Sustainability Act*. The implementation of the *Forest Information Manual* fulfils the obligations of the Ministry of Natural Resources under Section 68. of the *Crown Forest Sustainability Act*. The *Forest Information Manual* fulfils an integral role in supporting the other three regulatory manuals prescribed under the *Crown Forest Sustainability Act*: the *Forest Management Planning Manual*, the *Forest Operations and Silviculture Manual*, and the *Scaling Manual*.

The development of the *Forest Information Manual* began in 1994, at the same time that the *Scaling Manual* was being revised and the *Forest Management Planning Manual* and *Forest Operations and Silviculture Manual* were being developed. At the same time, a New Business Relationship was being established between the Ministry of Natural Resources and the forest industry, which guided the transfer of many forest management planning and operational responsibilities from government to industry.

By the year 2000, many of the responsibilities for forest management planning and conducting forest management activities on approximately 95% of the designated forest management units in Ontario had been transferred to the forest industry through the establishment of sustainable forest licences under the New Business Relationship. Both the Ministry of Natural Resources and the forest industry restructured their information management systems and technology to support the zchanging responsibilities and the requirements of the three regulatory manuals, and to incorporate advances in rapidly changing information technology (geographic information systems, analytical tools and internet access).

The *Forest Information Manual* is founded on a strong partnership with the forest industry. The requirements for information, as prescribed by the *Forest Information Manual*, provide a solid foundation and framework for exchanging data about Crown resources in a consistent and efficient manner and for making that information available to the resource stakeholders and the public in an open and transparent process.

The introduction of Version 1.0 of the *Forest Information Manual* represents the initiation of a longer term vision of improving access to information about Crown forests and improving the knowledge base of the Ministry of Natural Resources. Consistent and timely data and information will be an increasingly important resource for assessing the sustainability of Ontario's forests and a key strategy in supporting the Ministry's goal of sustainable development.

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1.0 INTRODUCTION

The *Crown Forest Sustainability Act* (CFSA) enables forest management activities to occur on Crown lands in Ontario according to an approved forest management plan that is prepared in accordance with the *Forest Management Planning Manual* (FMPM). These activities are authorized by the Ministry of Natural Resources (MNR), providing they contribute to the purposes of the CFSA, which are:

> *"... to provide for the sustainability of Crown forests and, in accordance with that objective, to manage Crown forests to meet social, economic and environmental needs of present and future generations."*

The *Forest Information Manual* (FIM) is one of four manuals mandated by the CFSA. The FIM prescribes the mandatory information and information products required by the Minister and forest resource licence holders with respect to managing and sustaining Crown forests in Ontario in accordance with the CFSA and its regulations. Section 68.(6) of the CFSA defines the scope of the FIM as follows:

> *"The Forest Information Manual may contain provisions respecting information systems, inventories, surveys, tests and studies that may be required by the Minister in respect of Crown forests and respecting information to be provided to the Minister in respect of Crown forests."*

The information and information products prescribed by this manual must be in respect of Crown forests. The FIM prescribes the requirements for creating or collecting information about Crown forests by identifying the types of information systems, inventories, surveys, tests, or studies to be applied or conducted. The FIM also prescribes the requirements for the provision of information about Crown forests to the Minister of Natural Resources.

The basic requirement for many of the information products described in the FIM is identified in the FMPM. The FIM is a technical document that further describes the details of what these information products will consist of and how and when they must be provided. A generic template is used to describe the mandatory requirements, standards, roles and responsibilities, timelines, and conditions for all information and information products prescribed by the manual.

In the past few years, the roles and responsibilities of the MNR and the forest industry have changed such that forest resource licence holders are responsible for carrying out much of the forest management planning process and conducting most of the forest operations. The MNR continues to protect the public interest and ensures that sustainability of the Crown forests are protected through the land use and forest management planning processes. Given this relationship, forest resource licence holders generate and possess much of the information required to support forest management planning.

A condition of forest resource licences requires that certain information and information products must be provided to the MNR in accordance with this manual. Sections 20 and 21 of the CFSA provide the Minister of Natural Resources with the authority to require forest resource licence holders to provide information in accordance with the FIM. The manual also prescribes the requirements for information to be provided to forest resource licence holders by the MNR and the timelines for this two-way provision of information.

The mandatory requirements for information and information products will not restrict or limit the Minister from requesting additional information from forest resource licence holders needed to fulfil the obligations of the MNR under the CFSA.

Most of the information or information products are required in a digital form, however other requirements may be met by providing hardcopies (paper maps) or by simply providing access to certain information and information products. The FIM also sets out direction for ownership, copyright and intellectual property rights of information about Crown forests which is consistent with the *Freedom of Information and Protection of Privacy Act*, the *Copyright Act*, subsection 21.(2) of the CFSA, and current government policies on information.

The manual prescribes technical specifications that describe how digital information will be provided and received. Technical specifications are maintained as separate documents outside the manual because they describe technical information details which may need to be modified more frequently than a regulated manual. Because these documents can be revised more readily than a regulated manual, technical details for receiving and providing digital information can be updated to take advantage of changes to information technology, management, and information systems without changing the basic information requirements.

The FIM, along with the other manuals regulated under the CFSA, is considered a work in progress. Version 1.0 of the FIM does not describe all of the information products required or that may be used for forest management planning or ensuring compliance with the CFSA and its regulations. Additional information product requirements will be specified in future versions of this manual.

1.1 Organization of the Forest Information Manual

The FIM is organized in a similar manner to the FMPM, except for a section on information policy at the beginning (Part A) and a section dealing with mapping requirements and standards at the end (Part E). Parts B, C, and D of the FIM reflect the organization of Parts A, B, and C (respectively) of the FMPM, and prescribe the requirements and standards for information and information products at different stages in the forest management planning process. Part B deals with information and information products required during strategic and operational planning; Part C identifies information requirements for annual forest operations; and Part D describes information needs for monitoring, reporting, and evaluation.

This manual also includes a glossary of information management terms and four appendices:

I. Technical Specifications Reference and Revision Process
II. Listing of Values by Group, Class, and Feature Type
III. Stewardship Inventory and Planning Inventory Attribute Look-up Tables
IV. Conversion from Traditional Forest Resources Inventory Attributes to Stewardship Inventory and Planning Inventory Attributes

1.2 Audience for the Forest Information Manual

The FIM and the technical specifications provide direction to information managers, database analysts, geographic information systems specialists, and information analysts involved in creating and using information about Crown forests. The FIM has also been written for Registered Professional Foresters, biologists, forest technicians, forest management planning teams, and other professionals involved in forest management planning.

The technical specifications may also be of interest to information users not directly involved in forest management planning, but who have a need to utilize or have access to the information.

2.0 APPLICATION OF THE FOREST INFORMATION MANUAL

One of the primary goals of the FIM is to describe a process to provide and receive information in a timely fashion, and in a standard and consistent format. Most of the information and information products prescribed in this manual must be provided in digital form and fulfil requirements of the FMPM.

Forest management plans are currently written once every five-year term. The five-year plan term, production cycle varies for each designated forest management unit in Ontario such that, at any point in time, forest management plans are in different stages of development and implementation. Information products which are required on a periodic basis, such as forest resources inventory (FRI) information, will be produced at different times based on the schedules of forest management plan production. It will be several years before a comprehensive provincial database exists for FRI information based on the requirements and standards prescribed in this manual and based on the staggered plan production schedules. This staggered planning schedule also affects when other information and information products, prescribed by this manual, are required.

Some of the information and information product requirements prescribed by the FIM take effect on the day the manual is brought into the regulation as described in subsection 68.(10) of the CFSA. Other information and information products are required after the date that the FIM is regulated as identified by the first date of effect described in the timelines associated with each requirement.

2.1 Template for Information and Information Product Requirements

A generic template is used to provide a common description of the requirements, standards, roles and responsibilities, timelines, and conditions for all information and information products prescribed in Parts B, C, D, and E of the FIM. Prescribed technical specifications are referenced in the Conditions section of each template.

2.1.1 Requirements

This section identifies the information or information products required and who must provide them. The following items may be described:

- Mandatory information or information product
- Who is responsible for providing and receiving information
- Description of the information or information product
- General format of the information (digital form, spatial versus tabular information, maps, etc.)
- Reference to the source of the requirement (e.g., FMPM, Part C, Section 3.2), where applicable
- Rationale for the requirement
- Brief description of spatial and/or tabular information requirements

2.1.2 Standards

This section provides a detailed description of all data attributes from which a given information or information product requirement is composed. The following items may be described:

- Data attributes
- Data attribute definitions and descriptions
- Reference to data attribute look-up validation tables, where applicable
- Details of spatial and/or tabular information requirements
- Standards for updating data

2.1.3 Roles and Responsibilities

This section provides further direction to support the development and provision of prescribed information and information products. The following items may be described:

- Functions and procedures associated with meeting requirements and standards for prescribed information and information products (such as auditing, quality control, process for revisions, updates and maintenance, archiving of information, etc.)
- Confirmation and verification of information
- Access to, or provision of, source information, or records and other information
- How information may be used or treated (confidential, proprietary, sensitive, and source information considerations)

2.1.4 Timelines

This section identifies when the information must be received and the timing associated with providing digital information. The following items may be described:

- When information must be provided (First Date of Effect that information is required)
- Applicable timelines for quality control, checking for completeness and verifying for accuracy, acceptance or approval, and provision of required revisions

2.1.5 Conditions

This section identifies how information should be created, treated, and/or provided and may prescribe further detailed requirements related to creating or to providing information or information products according to technical specifications.

2.1.5.1 *Technical Specifications Prescribed by Conditions*

Technical specifications describe the acceptable formats and methods to create and/or provide the prescribed information and information products. Technical specifications may include, but are not limited to, the following items:

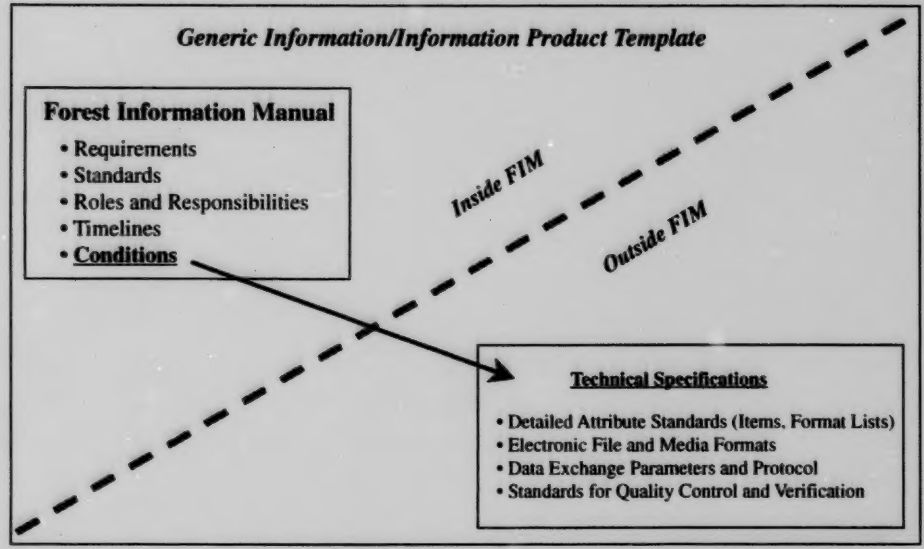
- Detailed data attribute descriptions
- Acceptable file and media formats
- File header and metadata requirements, identification, transfer and confirmation receipts
- Information exchange parameters and protocol (electronic data transfer specifications – EDT specs)
- Update procedures for assembling data and/or providing change data
- Standards/procedures for quality control, error handling, and verification
- Other specifications related to ensuring the provision and receipt of digital information

Technical specifications are described in separate documents and are prepared for individual information and information products. They are maintained outside the

FIM and may be revised periodically to consider more effective and efficient ways of managing, transferring, and receiving digital information. They provide technical details of how information must be provided and are considered to be a part of the mandatory information or information product requirements prescribed by the FIM. Figure I-1 illustrates the relationship between the FIM and technical specifications. Appendix I provides a listing of the technical specifications prescribed by the FIM and also describes the process for revising the technical specifications.

All components of the generic template, including technical specifications, are not applicable or appropriate for every information and information product prescribed by this manual. The information and information products must be completed and provided in accordance with the appropriate template components outlined for each section.

Figure I-1 **The relationship between the generic template used for all information and information products prescribed by the FIM and the technical specifications.**


Generic Information/Information Product Template
Forest Information Manual
• Requirements
• Standards
• Roles and Responsibilities
• Timelines
• Conditions
Inside FIM
Outside FIM
Technical Specifications
• Detailed Attribute Standards (Items, Format Lists)
• Electronic File and Media Formats
• Data Exchange Parameters and Protocol
• Standards for Quality Control and Verification

Note: Technical Specifications will not be applicable to all information and information products prescribed by FIM.

3.0 REVISIONS TO THE FOREST INFORMATION MANUAL

The FMPM is a pivotal document that identifies the basic requirements for information and information products which are prescribed in greater detail by the FIM. Version 1.0 of the FIM will become regulation while the Forest Management Planning Improvement Project (FMP Improvement Project), a project to review and revise the FMPM, is in progress. The FMP Improvement Project has targeted the spring of 2003 for the completion of revisions to the FMPM. Based on the close relationship between these two manuals and the commitment of MNR to revise the FMPM, Version 2.0 of the FIM will be produced on a similar timeframe and will align with, and compliment, the revised FMPM.

Another primary consideration in revising the FIM pertains to the experience and knowledge which will be gained through implementing Version 1.0. This implementation period will be approximately two years, based on the expectation that a revised FMPM and Version 2.0 of the FIM will be completed in 2003. Over this period, the provision of information to and from the MNR will be monitored to determine if improvements or revisions to the FIM are required.

Any revisions or new versions of the FIM will follow the requirements for reviewing and revising regulations, as set out by the Government of Ontario or the MNR.

4.0 IMPLEMENTATION AND REVISIONS TO TECHNICAL SPECIFICATIONS

The technical specifications form part of the requirement for information in accordance with this manual. Technical specifications describe detailed technical requirements for the creation or provision of information and are maintained as individual documents that are external to the regulated manual. Information management and information technology changes on a frequent basis. The details described in technical specifications must be re-examined and revised on a more frequent basis than the regulated manual since the basic requirements for information will not change as often as the technical specifications.

The implementation of the technical specifications will require a testing and evaluation phase to ensure that the most efficient and cost effective methods for transferring digital information can be incorporated. The testing and evaluation phase will identify the basis for improvements and revisions to the technical specifications. Testing and evaluation of the technical specifications will be conducted such that it does not impact the requirements and associated timelines for provision of information as prescribed by the FIM.

The technical specifications will be modified as required to optimize information transfer in an efficient and cost effective manner, allow for flexibility and innovation, and to ensure data integrity. A listing of the technical specifications prescribed by this manual and a description of the general process which will be used to revise the technical specifications is given in Appendix I.

PART A INFORMATION POLICY – OWNERSHIP, COPYRIGHT, AND INTELLECTUAL PROPERTY RIGHTS

1.0 INTRODUCTION

Part A of the *Forest Information Manual* (FIM) clarifies the relationships between the *Crown Forest Sustainability Act* (CFSA), the *Copyright Act*, and the *Freedom of Information and Protection of Privacy Act* (FIPPA). Part A also outlines the Ministry of Natural Resources' (MNR) direction on the ownership, copyright, and intellectual property rights of information provided to the Minister in accordance with this manual and in relation to the legislation.

The FIM describes two general categories of information: information, and information products. The term *information*, used by itself, refers to all forms of information from its lowest form (called data or raw data) to organizations (groups) of data in various digital forms (computer files) such as databases, spreadsheets, graphics, etc. *Information products* are comprised of data or information which has been organized into a specific format, structure, or end product, such as a digital computer file, a map, or a table of numbers. Information products are considered to be a form of information. All information requirements prescribed in this manual are not described by specific information products. The Glossary of Terms provides further clarification of these terms.

The FIM prescribes the requirements for information and/or describes the requirements for specific information products about Crown forests for the purpose of forest management planning or ensuring compliance with the CFSA and its regulations. The information and information products required by the Minister of Natural Resources must be prepared by forest resource licence holders or by other parties as prescribed by this manual and must be provided to the MNR. This manual also prescribes the requirements for the MNR to provide certain information and information products to forest resource licence holders.

1.1 Direction from the Crown Forest Sustainability Act

Subsection 68.(6) of the CFSA provides direction for the types of information that can be prescribed by the FIM, as follows:

> *"The Forest Information Manual may contain provisions respecting information systems, inventories, surveys, tests and studies that may be required by the Minister in respect of Crown forests and respecting information to be provided to the Minister in respect of Crown forests."*

This subsection of the CFSA also provides the Minister with the authority to prescribe the requirements for the provision of any information about Crown forests from any party (e.g., forest resource licence holders, other resource stakeholders, etc.). The responsible parties affected by the requirements for information are outlined in Part A, Section 2.0.

The FIM prescribes the requirements for information about Crown forests that is used in, or produced from, information systems. Information systems include, but are not limited to:

a) database management systems used for storing, maintaining, querying, and reporting data and information;
b) analytical tools or decision support systems used to model, project, simulate, or forecast data and information; and
c) geographical information systems (GIS) used to manage and analyze spatial data and information.

Sections 20. and 21. of the CFSA give direction regarding the requirements of forest resource licence holders to provide the Minister with information in accordance with the FIM. Forest resource licence holders are required to conduct inventories, surveys, tests, or studies, and to provide information in accordance with the FIM. The information that forest resource licence holders must provide, in accordance with this manual, are required for the purpose of forest management planning or ensuring compliance with the CFSA and its regulations.

1.1.1 Conducting Inventories, Surveys, Tests, or Studies

Subsection 20.(1) of the CFSA states:

> *"The Minister may require the holder of a forest resource licence to conduct inventories, surveys, tests or studies in accordance with the Forest Information Manual for the purpose of forest management planning or ensuring compliance with this Act and the regulations."*

The FIM describes the requirements of forest resource licence holders to conduct an inventory of forest resources on their licenced areas. This requirement and the information required in a forest resources inventory are described in Part B.

Forest resource licence holders are also required to conduct silvicultural effectiveness monitoring surveys. The information required in these surveys are prescribed in Part D.

Forest resource licence holders must also conduct other inventories, surveys, tests, or studies and keep such data, records, and information from these activities to support or verify information and information products prescribed by the FIM.

For the purposes of the FIM, inventories, surveys, tests, or studies may also include inspections, assessments, reports, samples, investigations, or any similar functions related to collecting data and information about Crown forests. The Minister may request that information about Crown forests that is collected from other inventories surveys, tests, or studies be provided to the Minister as directed in Subsection 68.(6) of the CFSA.

Subsection 20.(2) of the CFSA states:

> *"If a licensee fails to conduct the inventories, surveys, tests or studies as required, the Minister may cause them to be conducted, and the licensee is liable to the Minister for all costs associated with the conduct of the inventories, surveys, tests or studies."*

All costs of conducting the inventories, surveys, tests, or studies, as prescribed by this manual, must be borne by the licence holder responsible. If these requirements and responsibilities are not fulfilled, the Minister has the authority to cause the inventories, surveys, tests, or studies to be conducted and the forest resource licence holder is then liable to the Minister for all associated costs.

1.1.2 Providing Information

Subsection 21.(1) of the CFSA states:

> *"The Minister may require the holder or former holder of a forest resource licence to provide the Minister with information in accordance with the Forest Information Manual for the purpose of forest management planning or ensuring compliance with this Act and the regulations."*

The FIM prescribes the mandatory information and describes the information products required by the Minister. This also includes information that is created or used in information systems or that is created by the requirement to conduct inventories, surveys, tests, or studies, in accordance with Subsection 68.(6) or Section 20 of the CFSA. Circumstances of non-compliance in providing information prescribed by the FIM are subject to, and will be dealt with, in accordance with Part VII of the CFSA.

1.2 Copyright and Ownership of Information

The CFSA is consistent with, and operates within, the framework of the *Copyright Act* and the FIPPA.

The *Copyright Act* defines the creator of a work as the owner of the work. The creator of a work can utilize copyright (e.g., Queen's Printer for Ontario) and intellectual property mechanisms (e.g., patents and trademarks) to protect the use of his/her organization or expression of data and information, whether or not the work has been registered with the Copyright Commissioner. Copyright allows the creator of a work, which organizes, presents or manipulates data and information to specify how the work may be used, provided, or reproduced.

The Crown must maintain ownership and copyright to information about Crown forests, or related works created by the Crown, in order to make this information available to, and accessible by, the public. As stewards of Ontario's public forests, the MNR must have easy and unfettered access to information about the management of this resource. Crown ownership and copyright of information about Crown forests is also required to allow the Minister to use this information and related works to meet the purpose of, and carry out the MNR's obligations under the CFSA.

1.2.1 Information Created and Provided to the Crown

Subsection 21.(2) of the CFSA states:

> *"The Minister may deal with information obtained under this section as if the Minister had created the information."*

The information received by the Minister in accordance with the FIM will be treated as if the Minister had created the information. Consequently, the Crown has, and shares, ownership and copyright with forest resource licence holders for information and information products that they provide to the Minister as prescribed by the FIM. The planning inventory (a forest resources inventory) is an example of an information product which must be created and provided by forest resource licence holders in accordance with this manual and for which ownership and copyright are shared between the licence holder and the MNR. This relationship also applies to information and information products that are created, produced, or provided to the MNR by third parties on behalf of forest resource licence holders for the purpose of fulfilling their information requirements.

Under shared copyright and ownership, there shall be no restrictions or conditions on either the Crown or the forest resource licence holders regarding the use of information or information products provided by the licence holders to the Minister in accordance with this manual. The Minister may establish fees for providing this information to third parties (see Section 1.7.6) and/or may enter into revenue-sharing arrangements with forest resource licence holders (see Section 1.7.7).

1.2.2 Information Created and Provided by the Crown

The Crown owns and asserts exclusive copyright on information and information products that the MNR is required to create and to provide to forest resource licence holders in accordance with this manual. Planimetric base features information (such as water courses, water bodies, and provincial/municipal transportation routes) is an example of information that the Crown creates and maintains. The MNR must provide this planimetric base feature information to forest resource licence holders in accordance with this manual, but retains sole ownership and copyright of this information. Forest resource licence holders may only use this information for the purpose of fulfilling their licence obligations in accordance with the CFSA and its regulations, or as determined by the Queen's Printer for Ontario. The Queen's Printer for Ontario holds and administers copyright and intellectual property rights for information owned by the Crown and information obtained by the Minister in accordance with this manual. The Crown also asserts exclusive copyright on information products and related works that are created by the Crown using information or information products obtained by the Minister in accordance with the FIM.

1.3 Intellectual Property Rights and Freedom of Information

Intellectual property is the expression and/or organization of ideas, data, and information and the rights that protect it. Intellectual property rights are protected by mechanisms that include copyright, patents, trademarks, and other forms of intellectual property protection. Examples of some mechanisms which government uses to protect intellectual property rights are: trademarks, such as the stylized trillium symbol; and copyright statements, such as "© Queen's Printer for Ontario" that appear on government publications, maps, databases, research findings, photographs, etc. The information and information products prescribed by this manual and obtained by the Minister from forest resource licence holders are considered to be the intellectual property of the Crown and forest resource licence holders.

The FIPPA has two primary purposes:

a) to provide a right of access to information under the control of institutions in accordance with the principles that,
  i) information should be available to the public;
  ii) necessary exemptions from the right of access should be limited and specific; and
  iii) decisions on the disclosure of government information should be reviewed independently of government; and

b) to protect the privacy of individuals with respect to personal information about themselves held by institutions, and to provide individuals with a right of access to that information.

The Minister may require the provision of, or access to, source data, records, and information (see Section 1.4.2) for the purpose of auditing or verifying information or information products obtained by the Minister in accordance with the FIM. The Minister will respect the intellectual property rights of forest resource licence holders or other parties in requiring provision of, access to and use of source data, records, and information. The Minister will take into consideration the costs of production, viability of the licence holders or other parties under FIPPA, and copyright obligations affecting the licence holders or other parties, in making decisions regarding requests for the provision of, access to, or use of source data, records, and information.

The Minister may also require the provision of, or access to, records and other information (see Section 1.4.3) that are not described in an information product within this manual, but are considered as information prescribed by the FIM. The records and other information which are obtained by the Minister, as described in Section 1.4.3, will be treated as if the Minister created the information (see Section 1.2.1).

The Minister shall determine whether information obtained in accordance with the CFSA can be made available to the public. In making these determinations, the Minister shall comply with FIPPA, under which decisions that are made by the Minister may be appealed by the requestor or the affected party (forest resource licence holder or other party) to the Information and Privacy Commission.

1.3.1 Proprietary Information

Proprietary information is protected against free competition by secrecy, patent, copyright, or other mechanisms used to protect intellectual property rights, and is information for which the creator has exclusive legal rights and sole ownership. The information and information products prescribed by the FIM are not considered the proprietary information of a forest resource licence holder, because they:

a) are about Crown forests or are required for the purpose of forest management planning or ensuring compliance with the CFSA and its regulations;
b) must be provided to the Minister in accordance with the conditions of a forest resource licence;
c) shall be treated as if the Minister created the information; and,
d) are provided to the Minister based on requirements and standards for information that apply to all forest resource licence holders.

Information and information products prescribed by this manual shall normally be made available to the public. The Minister may restrict access to certain information that, if made available, could cause harm or threaten the existence, integrity or health of a natural resource feature or value (e.g., archeological sites, cultural heritage sites, or First Nations traditional use areas). The Minister may also restrict access to certain information to comply with provisions of FIPPA.

1.3.2 Organization of Information

The organization and quality of information, or the infrastructure and the resources needed to update and maintain information, may differ significantly between forest resource licence holders. The MNR has some control over the differences in the quality of information provided by a licence holder in accordance with this manual, but almost no control over how much a forest resource licence holder invests in the organization, maintenance, and upkeep of its data or information.

The FIM does not prescribe how a forest resource licence holder must organize its data or information for their own purposes. They may organize and maintain data or information in whatever form they need, as long as they provide the mandatory information and information products as prescribed by this manual. The Minister will respect the intellectual property rights of forest resource licence holders with regard to their organization of data or information.

1.4 Dealing with Different, Additional, or Other Information

The FIM, like other manuals regulated under the CFSA, is considered a work in progress. Consequently, not all information products about Crown forests used in forest management have been described in Version 1.0. This section describes the various types of information and their associated requirements and considerations. The Minister of Natural Resources will determine the type of information based on the direction provided in Section 1.4.

Forest resource licence holders may produce information products that are different from, or that contain information in addition to, the information products currently described by the FIM. Section 1.4.1 provides direction on how the Minister will deal with different or additional information.

The Minister may also require provision of, or access to, source data, records and information which may be required to check or verify the information and/or information products that have been provided in accordance with this manual. Source data, records, and information are described in Section 1.4.2.

In other cases, the Minister may require provision of, or access to, records and other information that have not been described by an information product, but are required for forest management purposes and are considered as information prescribed by this manual. Records and other information are described in Section 1.4.3.

A process to deal with information issues and issues that result from requests for the provision of, or access to, the various types of information described in this section is provided in Section 1.5.

1.4.1 Different or Additional Information

Different information is information that varies from the information required in the information products as described in the FIM, but is intended to meet the prescribed information requirements. Additional information exceeds the information requirements prescribed in the FIM.

Forest resource licence holders must notify the MNR before they use different or additional information products for forest management planning or ensuring compliance with the CFSA and its regulations. The MNR must ensure that the different or additional information products meet the mandatory information requirements prescribed by this manual and determine whether the information product can be used for these purposes. In all cases, the MNR shall determine if forest resource licence holders may provide the different or additional information products in place of the information products described by this manual. The MNR will also determine the conditions (formats and technical specifications) in which this information must be provided to the Minister. In determining these conditions, the MNR will consult with forest resource licence holders to determine the most efficient and cost effective methods to receive the required information. Unless otherwise determined by the MNR, forest resource licence holders or the responsible parties must provide the information products described in this manual.

The MNR will also determine whether the different or additional information products can be made available to the public in respect of the intellectual property rights of the forest resource licence holder and FIPPA, or in consideration of sensitive information about resource features or values and the obligations of the Minister under the CFSA and its regulations.

1.4.2 Source Data, Records, and Information

The MNR performs the roles and responsibilities of auditing, verifying, confirming, monitoring, reporting, evaluating, and approving information and information products prescribed by this manual. The MNR may require access to the source data, records and information that are used to create and provide information in accordance with this manual for the purpose of verifying or confirming the quality and accuracy of the information provided. Given reasonable notice, forest resource licence holders must grant access to source data, records, and information upon request by the MNR.

Forest resource licence holders will not normally be required to provide copies or files of source data, records, and information, which have been used to create or support the creation of information and information products prescribed by this manual. However, it may be more practical and more effective in some circumstances to provide them.

The MNR will consult with forest resource licence holders to determine applicable costs for providing source data, records, and information to the Crown or any conditions, such as confidentiality or sensitivity respecting its use and availability. The costs for providing the source data, records and information will include only the costs of obtaining a copy and do not include any of the costs associated with its production. The Crown shall not claim ownership, copyright or intellectual property rights to source data, records and information that are created by forest resource licence holders and are provided to the MNR. Source data, records, and information that are provided to the MNR are not subject to the copyright and ownership provisions of Section 1.2 of this manual and will normally be treated as confidential information.

Source data, records and information may include, but are not limited to:

- aerial photographs: large scale photography
  supplemental aerial photography
- satellite imagery
- maps
- surveys
- tests
- studies
- inspections
- past and current records
- pre- or post-operational field cruises
- permanent or temporary samples plots
- any data or information which has been collected and used to create, or support the creation of, information and information products prescribed by this manual.

1.4.3 Records and Other Information

Records and other information are considered as information prescribed by this manual, if they are in respect of Crown forests or are required for the purpose of forest management planning or ensuring compliance with the CFSA and its regulations. The MNR may require forest resource licence holders or other parties to provide access to, or provision of, records and other information that are not described by an information product in the FIM, but are considered as information prescribed by this manual.

The MNR will provide the rationale to the forest resource licence holder or the other parties as to why the records and other information are required. The MNR will consult with forest resource licence holders or other parties to determine the most efficient and cost effective ways to gain access to, or provision of, the required information. Based on consultation, the MNR will determine whether access to, or provision of, the records and other information is required, and the appropriate conditions for providing required information.

In some circumstances, the Minister may only require access to, versus provision of, records and other information prescribed by this manual. In these circumstances, the FIM may describe the records that forest resource licence holders or other parties must keep, the data to be kept in records, and how data and records shall be made available to the MNR.

1.5 Procedure to Resolve Information Issues

The procedure described in this section may be applied to resolve issues between MNR, forest resource licence holders, or other parties regarding requests for information or requirements for information deemed in accordance with this manual. This procedure must not be confused with, or used as an alternative mechanism to, the issue resolution procedure described in the FMPM, Part A, Section 3.4.

This procedure may be applied, but is not limited in application, to the following situations:

- **a)** requests for different or additional information products created by a forest resource licence holder, which are intended to meet the mandatory information requirements prescribed by the FIM;
- **b)** requests for information from the MNR made by forest resource licence holders or other parties that are deemed in accordance with information prescribed by this manual;
- **c)** requests for source data, records and information;
- **d)** requests for records and other information not described by an information product in the FIM, but that contain information about Crown forests or that are required for the purpose of forest management planning or ensuring compliance with the CFSA and its regulations; and,
- **e)** any issue or dispute regarding the information requirements prescribed by this manual.

The issue should initially be dealt with and, where possible, resolved between the initial parties involved. Most information requests will be related to carrying out the business of forest management planning at the local level. The concerned party may be a representative of a forest resource licence holder, another party, or the MNR. The concerned party must comply with the following procedure to ensure that the issue has been dealt with fairly, fully, and promptly.

1. The concerned party must identify the issue, preferably in writing, to the forest resource licence holder or the Registered Professional Forester employed by the MNR, and offer a proposed solution. The forest resource licence holder, the MNR's Registered Professional Forester and the concerned party (when not one of these two parties), will meet to discuss the issue and attempt to resolve it. The

forest resource licence holder and the MNR's Registered Professional Forester may each choose to involve an information management specialist or information systems person employed by their respective organizations to assist with any technical discussions related to the information request or issue. If these discussions do not produce a resolution, either the forest resource licence holder, the MNR's Registered Professional Forester or the concerned party may communicate the issue, in writing, to the appropriate MNR District Manager.

2. The MNR District Manager will arrange and attend a meeting of the forest resource licence holder, the MNR's Registered Professional Forester and the concerned party. The District Manager may choose to involve an information management specialist or information systems person from each respective organization to assist in technical discussions.

3. If the meeting does not produce a resolution to the issue, the MNR District Manager will ask each of the forest resource licence holder, the MNR's Registered Professional Forester and the concerned party to propose and recommend a solution(s), in writing, within five working days. The MNR District Manager will provide a resolution to the issue normally within 15 working days of receipt of those submissions and will provide a copy of a written resolution, with reasons, to the party concerned, the forest resource licence holder and the MNR Regional Director. Written submissions from all parties will be maintained on record by the parties involved.

4. If the concerned party is dissatisfied with the resolution provided by the MNR District Manager, they may request a review by the MNR Regional Director. The request must be made, in writing, within 15 working days of receipt of the MNR District Manager's resolution.

5. The concerned party may also make a request to the MNR Regional Director to appoint an independent panel, and may recommend a person or persons to sit on the panel, for the purpose of providing recommendations or advice to the MNR Regional Director.

6. The MNR Regional Director may choose to appoint an independent panel of an informed person or persons (i.e., not affiliated with the planning team or the plan approval team) for the purpose of providing recommendations or advice. The MNR Regional Director will consider any requests by the concerned party regarding the appointment of an independent panel and a person or persons to sit on such a panel.

7. In conducting the review, the MNR Regional Director may also review similar requests and records which provide the results for other issues that have been addressed by this procedure. The MNR Regional Director may solicit and consider the views of the concerned party, the forest resource licence holder, MNR's regional information management specialists, other MNR district, regional, or main office staff, and the MNR District Manager.

8. The MNR Regional Director will provide a copy of a written decision normally within 30 working days of receipt of the request for a review, with reasons, to the concerned party, the forest resource licence holder and the MNR District Manager. If an independent panel is selected, the MNR Regional Director will also provide, with the written decision, the recommendations or advice made by the independent panel.

9. All documentation resulting from the MNR Regional Director's review will be maintained on record, and will be used for future reference and consideration when resolving other information issues through this procedure.

Appropriate rationale must be developed to support a resolution or decision at each stage in the issue resolution procedure by considering the following factors:

- **a)** The relevance of the information request to the purpose of forest management planning or ensuring compliance with the CFSA and its regulations. If the information request does not satisfy this test, the procedure is no longer valid or applicable.
- **b)** The sensitivity of the information requested (i.e., if released would it pose a threat to the existence, integrity, and health of natural resource features or values, including land uses).
- **c)** The implications and provisions of FIPPA, in terms of protecting the interests of the party providing the information and the institution (government) in control of the information.
- **d)** The copyright implications (or infringements) on the creator or owner by releasing the requested information. For example, copyright may restrict the ability of a forest resource licence holder to provide information when they have purchased a copy of, or access rights to, satellite imagery. This factor may also apply to the MNR. Crown copyright is administered by the Queen's Printer for Ontario, who must be involved in making decisions that affect copyright of information owned by the Crown or information that is obtained by the Minister in accordance with this manual.
- **e)** The potential uses of the information requested. Where possible, discussions regarding the use(s) of the information with the party requesting it should be encouraged in an open and consultative fashion.
- **f)** The costs of producing the information and making the information available to the party requesting it.
- **g)** The degree of access needed to meet the information request (i.e., should the information be provided in its original form, in digital or hardcopy form, provided in a lesser or more convenient form, or simply made available for viewing).
- **h)** Any fees that may be applicable to creating or making the information available to the party requesting it. The Ontario government's policies on managing, pricing, and distributing government intellectual property may provide guidance.

i) Available records from previous cases where similar issue resolution procedures have been applied to ensure consistency with decisions made in other MNR administrative districts and regions.

j) Any other factors or unique circumstances that may influence decisions respecting information requests or information issues.

1.6 Access to Information Prescribed by the Forest Information Manual

The Environmental Assessment (EA) Board's Decision on the MNR's Class *Environmental Assessment for Timber Management on Crown Lands* in Ontario in April, 1994 and the CFSA supports an open and consultative process which is transparent to the public. The public will normally be provided access to all information and information products prescribed by the FIM, unless otherwise determined by the Minister in consideration of sensitive information about resource features and values, or FIPPA.

Public (third party) requests for access to information about Crown forests will normally be handled by the MNR in accordance with the direction set out in this manual. Public (third party) access to information, which has been obtained by the Minister in accordance with this manual, may involve the provision of:

- hard copies of information or information products, such as maps, audits, reports, documents, tables, or any physical or visual organization of data or information;
- digital copies of information or information products, such as electronic information, computer files or records, geographical information coverages, databases or any electronic organization of data or information;
- opportunities to view information, such as public information centres, appointments, response to inquiries or other such arrangements which allow quick and efficient public access to information; and
- any combination of these provisions.

The Minister may determine the conditions by which access to information is provided, may prescribe fees for providing information products, and may determine how revenues received from the sale of information or information products shall be distributed.

The Minister may also determine how information or information products prescribed by this manual may be used by third parties. The Minister may enter into agreements or arrangements with third parties and specify the conditions by which third parties may use the information provided to them.

1.7 Protocol to Deal with Information Prescribed by the Forest Information Manual

The MNR recognizes the efforts and costs required of forest resource licence holders or other parties to create and maintain certain information and information products as prescribed by this manual. In acknowledgement of these efforts, this section discusses:

- recognition of forest resource licence holders in creating information and information products prescribed by this manual;
- notification to forest resource licence holders regarding third party use and users of information and information products;
- the original source of information and information products prescribed by this manual;
- the establishment of fees for making information or information products available to the public; and
- revenue sharing of certain information products prescribed by this manual.

1.7.1 Recognition for Creating Information

Forest resource licence holders may provide a logo, which gives credit and recognition of their company, on any information or information products submitted to the Minister. The logo may include a symbol and a name that is relevant to the forest resource licence holder who provided the information. The MNR may also apply its logo, as well as the government copyright label, to the information or information product.

The logo provided by a forest resource licence holder will not, in any way, affect how the Minister may use the information or information products obtained in accordance with this manual, or the provisions for copyright and ownership described in Section 1.2.

1.7.2 Disclosure of Information Use

The Minister of Natural Resources will determine how information obtained in accordance with this manual may be used. This manual does not restrict the Minister's use of information obtained in accordance with the CFSA and its regulations. Similarly, forest resource licence holders or other parties are not restricted as to how they use information that they create and provide to the Minister in accordance with this manual.

The Minister is not required to disclose the use of information or information products obtained in accordance with this manual. Forest resource licence holders are not required to disclose their use of information or information products which they create and provide to the Minister in accordance with this manual.

The MNR must comply with FIPPA regarding the disclosure of information obtained by the Minister in accordance with this manual, and the disclosure of related information pertaining to the use or users of that information.

1.7.3 Archiving Digital Information

The MNR shall comply with the *Archives Act* when retaining digital information and information products which the Ministry receives or provides in accordance with this manual. All such information and information products must not be modified in any way prior to being archived and must be dated and archived in such a manner as to allow them to be retrieved and reproduced.

Forest resource licence holders or other parties must also date and archive all digital information and information products that they provide to, or receive from, the Minister, in accordance with this manual. Licence holders must archive this information for a period of time necessary to meet current requirements under the CFSA and its regulations. Licence holders must also ensure that the information and information products are not modified prior to being archived and that the archived information and information products can be retrieved and used to meet those requirements.

The MNR, forest resource licence holders, and other parties must keep records which identify all details about the archiving of information or information products prescribed by this manual, and may request and be provided access to any records related to archiving the information and information products.

1.7.4 Reproduction of Digital Information

Digital information or information products must be reproduced prior to any modifications, revisions, additions, changes, or work being performed on the original information. Reproductions of digital information or information products must not affect the integrity of the original work.

Reproductions of any information provided to the Minister in accordance with this manual, by other than the forest resource licence holder or another party who created it, cannot be made without permission from the Queen's Printer for Ontario.

1.7.5 Original Source of Information

Any information or information products prescribed by this manual which have been modified, revised, added to, or changed in any way will not be considered original work. The creator of information and information products prescribed by this manual must not alter in any way the original information that is archived in accordance with Section 1.7.3. If the original information or information which has been archived requires modification, the creator of the work must notify the other party that a change will occur. The creator of the work will provide the other party with a copy of the modified information. The MNR, forest resource licence holders, and other parties must immediately archive the modified information.

The creator of the information and information products prescribed by this manual is considered to be the holder and source of the original information. The creator of all information and information products prescribed by this manual is stated for each requirement. Information and information products provided to the MNR in accordance with this manual, and that are archived in accordance with Section 1.7.3 of this manual, are also considered as the original work.

In any discrepancies respecting the integrity or quality of information and information products prescribed by this manual, the creator of the work will be considered as the holder and source of the original work.

1.7.6 Fees for Information

The FIM does not set out fees for making available or providing information and information products prescribed by the manual to third parties or the public. The Minister will determine the applicability of any fees and establish the appropriate fees consistent with the Ontario government's policies on managing, valuing, and pricing government intellectual property. The Minister may consult with forest resource licence holders or other parties prior to setting fees for making available or providing these information and information products to third parties or the public.

The MNR is not obligated to inform forest resource licence holders or other parties of fees which may be applied to information which the Ministry may create from the information or information products prescribed by this manual.

1.7.7 Revenue Sharing

The Minister of Natural Resources may enter into revenue-sharing arrangements with forest resource licence holders or other parties with respect to the distribution of any revenues which may be collected from the sale of information and information products prescribed by this manual. However, the FIM does not describe these arrangements.

1.8 Data Sharing and Data Exchange Agreements

Prior to the preparation of this manual, agreements between forest resource licence holders and the MNR were developed for the purpose of exchanging and sharing certain information. These agreements took several forms:

i) Data Sharing Agreement
ii) Data Exchange Agreement
iii) Memorandum of Understanding
iv) Interim Memorandum of Understanding

Any agreements or any parts of agreements which address an exchange or provision of the information or information products prescribed by the FIM will be terminated upon the date of implementation of this manual. Upon the termination of these agreements, the full requirements and standards for information and information products prescribed by the FIM shall take effect.

Implementation of the FIM has no effect on information sharing and exchange arrangements or agreements that deal with information that is not in respect of Crown forests or that is outside the purpose of forest management planning or ensuring compliance with the CFSA and its regulations.

The FIM also does not affect existing arrangements or agreements between forest resource licence holders and the MNR regarding the one-time shared production responsibilities to create digital forest resources inventories which were established prior to the implementation of this manual.

1.9 Information Prescribed in Other Manuals Mandated by the *Crown Forest Sustainability Act*

The FIM, like other manuals required by the CFSA, will evolve and develop with time and implementation. Version 1.0 of the FIM does not describe all of the information products required for the purpose of forest management planning or ensuring compliance with the CFSA and its regulations.

The information required by the other manuals mandated by the CFSA (FMPM, the *Forest Operations and Silviculture Manual*, and the *Scaling Manual*) are considered to be information or information products prescribed by the FIM. As such, the requirements to provide the information and information products identified in the other CFSA manuals will be administered in accordance with the FIM. Instances of non-compliance in providing information and information products prescribed by the FIM, or information required by the other CFSA manuals, is subject to, and will be dealt with according to, Part VII of the CFSA.

1.10 Information Partnering and Innovation

Information management is a costly and necessary investment. One of the principles applied in the development and implementation of this manual is to allow, promote, and foster innovation with respect to the information and information products needed to meet the purpose of the CFSA and its regulations. Forest resource licence holders, the MNR or other parties, as identified in this manual, are responsible for preparing and providing the information and information products prescribed by this manual. These responsibilities do not restrict forest resource licence holders, the MNR or other parties from establishing cooperative arrangements and partnerships to enhance the collection, creation, quality, use, or provision of information required for forest management planning or ensuring compliance with the CFSA and its regulations.

The MNR will consider this principle when determining whether information products that are different from, or that contain information in addition to, the information products described by this manual may be used (see Section 1.4).

The implementation and future development of the FIM must not prevent the development of innovative means to collect, create, or use better data and information, or develop better information systems. The establishment of partnerships is critical to creating better information and improving the knowledge base. Implementation of this manual must take into consideration any factors that may influence innovation, improve the quality of data or information, or affect the pursuit of better data and information about natural resources that contribute to fulfilling the purpose of the CFSA.

2.0 PARTIES RESPONSIBLE FOR MEETING INFORMATION REQUIREMENTS

The FIM identifies five different parties responsible for providing information in respect of Crown forests:

- Sustainable forest licence (SFL) holders
- Plan holders
- Other forest resource licence holders
- MNR
- Other stakeholders

Most of the requirements in Version 1.0 of the FIM affect SFL holders, plan holders, and the MNR who have responsibilities for preparing forest management plans or approving and monitoring the implementation of forest management plans. The definitions of these parties apply to all information requirements prescribed throughout this manual.

2.1 Sustainable Forest Licence Holders

Sustainable forest licence holders are responsible for preparing forest management plans on licenced Crown areas, conducting forest management operations in accordance with an approved plan, and reporting on those operations. As such, SFL holders are required to provide many of the information and information products prescribed by the FIM. Where the requirements for information identify SFL holders as the responsible party, those requirements apply to the holder of an SFL licence issued under Section 26 of the CFSA.

Sustainable forest licence holders are also responsible for securing information prescribed by this manual from overlapping licence holders who are issued forest resource licences in accordance with Section 38 of the CFSA. Sustainable forest licence holders are expected to enter into an agreement with overlapping licence holders regarding the provision of information prescribed by this manual in accordance with Section 8 of Ontario Regulation 167/95.

2.2 Plan Holders

On designated forest management units which are not managed under an SFL, the Crown or another designated party (e.g., Algonquin Forestry Authority) is responsible for preparing and implementing forest management plans. These management units are referred to as Crown forest management units and the MNR or other designated party is considered as the plan holder. Where the requirements for information identify plan holders as the responsible party, those requirements apply to the MNR or the party responsible for forest management planning and implementing approved forest management plans on a Crown forest management unit.

Plan holders must generally meet the same information requirements as SFL holders in terms of the responsibilities to prepare forest management plans, conduct operations in accordance with an approved plan, and report on those operations. Therefore, where the requirements for information or information products identify SFL holders (plan holders) as the responsible party, those requirements must be met by one party or the other, whichever is applicable.

2.3 Other Forest Resource Licence Holders

Version 1.0 of the FIM describes the requirements for the holder of other forest resource licences to provide certain information, such as values information on Crown forest management units. Where the requirements for information identify other forest resource licence holders as the responsible party, those requirements apply to the holders of other forest resource licences issued under Section 27 of the CFSA.

The requirements for information that affect other forest resource licence holders do not include responsibilities associated with preparing forest management plans, but they do include the responsibilities for information associated with conducting forest operations and, in some cases, reporting on those operations. The requirements for other forest resource licence holders are normally related to the provision of information, such as values information, in hardcopy form, or relate to requests by the MNR for specific information related to forest operations or the conditions described in those forest resource licences.

2.4 Ministry of Natural Resources

In some cases, the MNR must provide information, such as planimetric base feature information or values information (see Part B, Section 3.0), to SFL holders (plan holders) or other forest resource licence holders. Where the requirements for information identify the MNR as the responsible party, those requirements may apply to the MNR in general or may apply specifically to an MNR district, region, or main office.

2.5 Other Stakeholders

Other stakeholders include other licenced and recognized users of Crown forest resources. Version 1.0 of the FIM does not prescribe the requirement for other stakeholders to create or provide specific information or information products. However, in some instances, the Minister of Natural Resources may request the provision of information in respect of Crown forests from any party as described in Part A, Section 1.1, which may include other stakeholders.

PART B

INFORMATION AND INFORMATION PRODUCTS FOR STRATEGIC AND OPERATIONAL PLANNING

1.0 INTRODUCTION

Part B of the *Forest Information Manual* (FIM) prescribes information and information products that are required for preparing forest management plans in Ontario. These information and information products support the development of the long-term strategic direction for managing Crown forests and the planning of forest operations for the term of a forest management plan.

The information and information product requirements include:

- Planimetric Base Feature information
- Values information
- Forest Resources Inventory (FRI) information
- Stewardship Inventory
- Planning Inventory
- Information related to information systems used in forest management planning:
  - Forest modelling information
  - Landscape processes and diversity modelling information
  - Habitat supply analysis information
  - Information contained in the forest management planning tables described in Part A of the *Forest Management Planning Manual* (FMPM)

Section 2.0 describes the information required at the start of the forest management planning process. This section also describes the framework for creating the planning database, which represents a collection of information and individual information products used to support forest management planning.

Section 3.0 describes the requirements for the provision of planimetric base feature information, which is used to support the development of forest management plans, forest resource inventories and other spatial information products relevant to forest management planning.

Section 4.0 describes the requirements to collect, confirm, verify, provide, update and maintain values information.

Section 5.0 describes the requirements for FRI information. This section also describes the requirements for updating planimetric base feature information, incorporating planimetric base features into a FRI, and the requirements to create two specific FRI products; the stewardship inventory and the planning inventory.

Section 6.0 prescribes the requirements for information that are used in, and created from, information systems that are applied in forest management planning. The requirements prescribed in this section are based on the information relevant to forest modelling which is used and created from tools such as the Strategic Forest Management Model (SFMM). This section also prescribes the requirements to provide information relevant to landscape pattern and diversity analyses and habitat supply analyses, using tools such as the Landscape Ecological Analysis Package (LEAP II), Ontario Wildlife Habitat Assessment Model (OWHAM), and Ontario Marten Analyst (OMA).

The information and information products prescribed in Part B are required periodically at specific stages throughout the forest management planning process as well as during plan implementation, monitoring and assessment. The terms of reference of a forest management plan must identify the duties and responsibilities of specific planning team members to prepare and conduct analyses, and to produce information in accordance with the FMPM and the FIM.

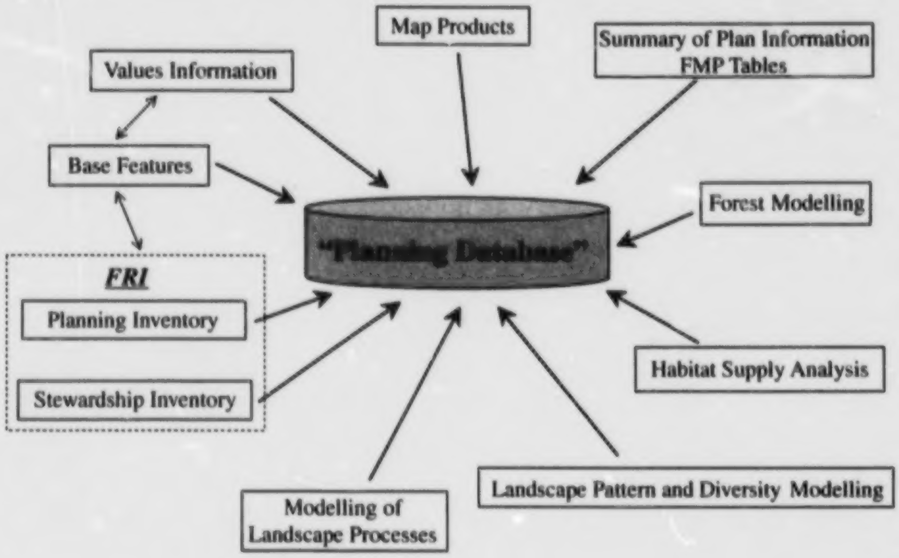
2.0 PLANNING DATABASE: A FRAMEWORK

The planning database is a collection of information and information products that is created and used during the development of a forest management plan. The planning database must be preserved for the term of an approved plan and beyond to support the implementation, assessment, and subsequent evaluation of the plan.

The types of information and information products required in a planning database are illustrated in Figure B-1. Figure B-1 does not describe the full range of information products that may be created in the planning database. The MNR must approve the use of information products that are part of the planning database if the information products are different from those described in this manual. The composition of a planning database may vary between management units, and between plans, depending on the availability of information and differences in forest management direction.

All information described by the FMPM is considered information prescribed by the FIM, and is required to be produced in the manner set out in the FMPM. However, not all of the information products in a planning database are described in Version 1.0 of the FIM. For example, the FMPM requires the creation and provision of the Report of Past Forest Operations (RPFO) and Supplementary Documentation. These information products are not described in Version 1.0 of the FIM, however, the information is required for the purpose of forest management planning and is therefore considered as information prescribed by this manual.

Figure B-1. The types of information and information products in a planning database.


Map Products
Summary of Plan Information FMP Tables
Values Information
Base Features
"Planning Database"
Forest Modelling
FRI
Planning Inventory
Stewardship Inventory
Habitat Supply Analysis
Landscape Pattern and Diversity Modelling
Modelling of Landscape Processes

Note: The requirements for map products are described in Part E.

3.0 PLANIMETRIC BASE FEATURES INFORMATION

Planimetric base features are various kinds of known and static geographic features or areas which identify subdivisions of land, water, vegetation, environmental features, and other physical and administrative boundaries. Planimetric base features can be natural phenomena, such as lakes and geological landforms, or can depict human influences, such as ownership, park designations, and other legal or legislative boundaries. Planimetric base features are maintained in digital geographic information coverages which provide a spatial frame of reference for portraying or associating other physical, biological, or resource feature inventory data. Planimetric base features provide fixed reference points on the surface of the earth when represented in two dimensions (a planar surface), such as on a map.

Planimetric base features information provides a consistent geographic base fabric for relating other inventory information such as forest resources inventories, wildlife habitat, ecological land classification, values, and various other biological information. Planimetric base features information is also used in various analytical modelling processes, such as viewshed analysis, water movement and flow analysis, road location and transportation network analysis, watershed analysis, landscape diversity analysis, harvest scheduling, and other spatial analyses which require relational analysis of geographic information.

Planimetric base feature coverages were originally maintained in the Ontario Digital Topographic Data Base (ODTDB) and were managed by MNR's Ontario Basic Mapping (OBM) program. Now, the MNR maintains the planimetric base features information in its values information system.

The planimetric base feature coverages contain the geographic locations and descriptions of topographic, cultural, and cadastral features of Ontario's landbase. These coverages include hydrography (lakes, rivers, drainage), vegetation, transportation (roads, railways), buildings, communication and power (hydro lines), hypsography (elevation points, contours, digital elevation/terrain models), parks, First Nations lands, township boundaries, and town points. Planimetric base features, such as lakes or rivers may also be treated as values for the purposes of forest management planning.

A specific subset of planimetric base features information, referred to as inventory base features, forms the foundation and underlying spatial fabric for portraying FRI information (stewardship and planning inventories). The requirements for inventory base features information, which are an integral part of maintaining FRI information, are described in Section 5.1.

3.1 Requirements for Planimetric Base Features Information

The MNR will ensure that sustainable forest licence (SFL) holders (plan holders) are provided with planimetric base features information, in digital form, for the creation and maintenance of forest resources inventories or for the purpose of forest management planning. The MNR will also ensure that other forest resource licence holders are provided with planimetric base features information where required, for the purpose of conducting forest operations or fulfilling their licence obligations in accordance with the *Crown Forest Sustainability Act* (CFSA).

Sustainable forest licence holders (plan holders) and other forest resource licence holders may request planimetric base features information for these purposes at any time. The MNR will ensure that the requested information is provided in accordance with the timelines and conditions described in Sections 3.4 and 3.5 respectively, unless the information is considered to be sensitive. The considerations for sensitive planimetric base features information are described in Section 3.3.

Planimetric base features can be grouped into two categories: administrative base features and geographic base features. A listing of administrative and geographic base features used in creating and maintaining FRI information and/or used for the purpose of forest management planning is contained in Appendix II of this manual. Appendix II is not considered an all-inclusive listing of planimetric base features.

3.1.1 Administrative Base Features

Administrative base features are man-made boundaries, such as forest management units or ownership parcels, which identify areas designated for legal, political, tax base, population base, land-use zoning, or management decision purposes. Administrative boundaries may or may not be defined by physical geographic features. Administrative base features represent surficial boundaries that affect the creation and maintenance of FRI and decisions made in forest management planning. For example, designated forest management unit boundaries are an administrative base feature that is used to define the map extent and boundaries of an FRI and is the geographic area on which forest management plans are based.

3.1.2 Geographic Base Features

Geographic base features are physical features, such as lakes, rivers, wetlands, hydro lines, gas pipelines, provincial highways, municipal roads, and railways that provide fixed and static spatial reference points on the surface of the earth. Geographic base feature information often provides the foundation for other thematic coverages containing natural resource, biological, environmental or other inventory-based information. A specific set of geographic base features, referred to as inventory base features, are used to establish the geographic base fabric of an FRI coverage (i.e., forest polygon coverage) and provide a preliminary classification of area into different water type polygons and rudimentary land type polygons (see Section 5.1).

3.2 Standards for Planimetric Base Features Information

Planimetric base features information is maintained in the MNR's values information system and is managed in several geographic (thematic) coverages. The information standards vary based on the various types of planimetric base features, and the associated spatial and descriptive information that are maintained in each coverage.

Some planimetric base feature coverages are maintained by other government agencies or non-government organizations and are managed as part of the Ontario Land Information Infrastructure (OLII) initiative. The OLII initiative secures some planimetric base features information through strategic partnerships and data-sharing alliances with these different agencies or organizations. The standards for information, maintained in the Land Information Ontario warehouse, are usually set by the custodian responsible for maintaining the data, as described by different partnership agreements and data-sharing alliances. If such information is required for the purpose of forest management planning or for ensuring compliance with the CFSA and its regulations, the MNR will ensure that SFL holders (plan holders) or other forest resource licence holders have access to the information. The MNR may make restrictions on the availability of this information, based on its sensitivity or confidentiality, as described in Section 3.3.

The former OBM program developed and maintained the standards for many planimetric base feature coverages now maintained as part of the MNR's values information system. Many of these standards are documented as part of the Natural Resource Values Information System (NRVIS), the ODTDB, and Ontario's Geo-Spatial Data Base.

The standards for planimetric base features information are described in the *Technical Specifications for Planimetric Base Feature Information*.

3.3 Roles and Responsibilities for Planimetric Base Features Information

The MNR is responsible for ensuring that planimetric base features information, which is required for the purpose of forest management planning, is maintained and updated in MNR's values information system. The MNR will also ensure that the best available information is provided to SFL holders (plan holders) or other forest resource licence holders in accordance with Section 3.1

Planimetric base features information, which is used in the preparation of FRIs and/or forest management plans, is owned by the Crown or is managed under agreement or licence with the Crown. The Queen's Printer for Ontario administers the copyright of this information on behalf of the Crown. Sustainable forest licence holders (plan holders) or other forest resource licence holders may only use planimetric base features information provided by the MNR for the purpose of forest management planning or fulfilling their licence obligations under the CFSA. Any other use of planimetric base features information must be approved by the Queen's Printer for Ontario.

Some of the planimetric base features information maintained in MNR's values information system may contain confidential or personal information. The MNR will comply with the *Freedom of Information and Protection of Privacy Act* (FIPPA), or with any agreements or conditions of use that are established with other agencies/parties, in determining whether such information can be made available to SFL holders (plan holders) or other forest resource licence holders.

If the availability of certain planimetric base features information may threaten the existence, health, or integrity of values or other sensitive features, the MNR will determine if the information can be provided or to what extent certain information may be provided. Part B, Section 4.1.4 provides further direction on the use and accessibility of sensitive information.

3.4 Timelines for Provision of Planimetric Base Features Information

The MNR must ensure that SFL holders (plan holders) are provided with planimetric base features information that is required for the development of a new forest management plan, at the start of planning process. Forest management plans normally require a 27-month planning process. Therefore, planimetric base features information must be provided to SFL holders (plan holders) by the January 1 which is 27 months prior to the implementation date of a new forest management plan. For example, MNR will ensure that planimetric base features information is provided to SFL holders (plan holders) by January 1, 2002 for a plan that takes effect on April 1, 2004. This timeline for provision of planimetric base features information does not affect the timelines for provision of inventory base features information as described in Part B, Sections 5.1.2.4, 5.2.4, and 5.3.4.

Sustainable forest licence holders (plan holders) or other forest resource licence holders may also request planimetric base features information at any time for the purpose of conducting forest operations or fulfilling their licence obligations in accordance with the CFSA. The MNR will normally provide the planimetric base features information in accordance with Section 3.3 of this manual, within 30 working days of the request. If the information request cannot be met within the 30-day period, the MNR will inform the SFL holder (plan holder) or other forest resource licence holder as to when the information can be provided.

3.4.1 First Date of Effect for Provision of Digital Planimetric Base Features Information

The first effective date for provision of digital planimetric base features information, in accordance with the conditions described in Section 3.5, commences January 1, 2002. The MNR will provide the best available planimetric base features information, in the available digital form, to SFL holders (plan holders) or other forest licence holders prior to this first effective date, if requested. However, the information supplied by the MNR, prior to the first effective date, does not have to meet the technical specifications as described by the conditions in Section 3.5.

3.5 Conditions for Provision of Planimetric Base Features Information

Planimetric base features information will be provided to SFL holders (plan holders) or other forest resource licence holders in a digital format, as described by the *Technical Specifications for Providing Planimetric Base Features Information*. This document will be revised and published periodically to reflect updates to the numerous geographic coverages which contain planimetric base features information.

The MNR may also provide planimetric base features information to SFL holders (plan holders) or other forest resource licence holders in other forms, such as maps, where the provision of such information satisfies the requirements of the licence holder.

4.0 VALUES INFORMATION

Values are features, benefits, or conditions of the forest that are linked to a geographic area, that are of interest from various points of view, and that must be considered in forest management planning.

Values information can be provided by any person or party at any time. Information about values normally comes from the MNR or other government staff; SFL holders (plan holders), other forest resource licence holders and their operators; non-government organizations, third parties, other resource users, or the public; and First Nations and native communities.

The quality of values information is related to the method by which the information was identified or collected. The number of confirmed and verified values is expected to increase, and the quality of information about those values is expected to improve, with each successive forest management plan. The public consultation process described in the FMPM supports the collection and provision of information about values at any time during the development and implementation of a forest management plan.

Values can be classified into two groups based on the requirements to provide information for forest management planning: timber values and non-timber values. A listing of values classified into timber and non-timber groups is contained in Appendix II of this manual. Appendix II is not considered to be an all-inclusive listing.

Timber values include such features as growth and yield plots, research plots, and seed orchards. The FRI is not considered as a timber value for purposes of prescribing requirements for values information. The information requirements for forest resources inventories are described in Section 5.0.

Non-timber values include such features as cultural heritage sites, native values, and critical wildlife and fisheries habitat areas, such as mineral licks, raptor nests, or spawning areas. Non-timber values also include various uses such as wild rice production areas, recreational areas, native use areas, and traditional use areas.

4.1 Requirements for Values Information

Part A, Section 1.4.4 of the FMPM states the requirement for the MNR to produce values maps for each forest management unit. Values maps provide a summary of the geographic location of *known* values about which further inventory information is available. A value is considered to be a *known* value when there is sufficient information to describe its geographic location and its basic features. Known values must be considered in forest management planning. The MNR shall determine if a value can be treated as a known value based on the available information and in consideration of the standards described in Section 4.2 and the roles and responsibilities described in Section 4.3.

This section describes the requirements of the MNR, SFL holders (plan holders), and other forest resource licence holders to collect and provide values information.

4.1.1 Requirements for the Ministry of Natural Resources

The MNR must ensure that information about non-timber values is collected in accordance with the standards described in Section 4.2 and must ensure that priority is given to those values that are affected by proposed and optional areas of forest operations for the term of a forest management plan that is under preparation. The MNR must also ensure that the responsibilities to meet these requirements are not transferred to SFL holders (plan holders) or other forest resource licence holders.

In some cases, the MNR owns and/or is responsible for the management of some timber values such as research plots, growth and yield plots, and other permanent sample plots. In these cases, the MNR must ensure that information about timber values is collected in accordance with the standards described in Section 4.2.

The MNR will also ensure that values maps are updated and that current values maps are provided to planning teams for forest management planning purposes. The maps and digital information must include the values within the forest management unit for which the plan is being written, as well as values that are outside the forest management unit that may be affected by proposed or planned forest operations. The timelines and conditions for providing digital values information are described in Section 4.4 and Section 4.5.

The MNR staff at district offices, with assistance from regional and main office MNR staff, must enter and update values information received from SFL holders (plan holders), other forest resource licence holders and other sources into the MNR's values information database. As well, they must prepare and maintain values maps and provide these maps to the applicable planning teams as specified in the FMPM and in accordance with Part E of the FIM.

Values that are displayed on maps and that are considered in forest management planning must be supported by further information gathered or created from inventories, surveys, tests, or studies (referred to as source data and information). A reference to source data and information must also be maintained in the values information database.

The MNR must provide SFL holders (plan holders) with digital information about values at the start of the forest management planning process. This is considered to be part of the Background Information as described by the FMPM (Part A, Section 1.4). The district office staff of the MNR will also provide SFL holders (plan holders) with updates to digital information (includes spatial and tabular information) about values as new or revised data becomes available during the preparation or implementation of a plan. The maintenance of values information is a continuous and ongoing process.

4.1.2 Requirements for Sustainable Forest Licence Holders (Plan Holders) and Other Forest Resource Licence Holders

Sustainable forest licence holders (plan holders) and other forest resource licence holders are required to collect and provide information for all new timber and non-timber values, and corrections to information about known values, that are encountered and recognized during the implementation of forest management operations. Only the new or changed (corrected) values information must be provided in accordance with the standards described in Section 4.2 and the conditions described in Section 4.5.

Sustainable forest licence holders (plan holders) and other forest resource licence holders are also required to collect and confirm the geographic location and basic description information for timber values, such as growth and yield plots, research plots, and seed orchards in accordance with the roles and responsibilities described in Section 4.3.

Sustainable forest licence holders (plan holders) must provide this information in a specific digital format to the MNR for the preparation of values maps and for consideration in forest management planning. The timelines and conditions for providing this information are described in Section 4.4 and Section 4.5, respectively. Other resource licence holders are only required to provide hard copies (maps) of information in accordance with the standards described in Section 4.2.

4.1.3 Requirements for Planning Teams

Planning teams are required to utilize the current values information (maps and digital information) which have been provided by the MNR district staff. Planning teams must also consider any updates to values information that are provided by the MNR in accordance with Section 4.3 and Section 4.4.

4.1.4 Sensitive and Personal Information

There are two types of information related to values that require careful consideration and may require restricted access or confidentiality (no access): sensitive information about values and personal information pertaining to values.

4.1.4.1 *Sensitive Information about Values*

In some cases, information about certain values such as, the location and description of native values, cultural heritage sites, fish spawning areas, or habitats of vulnerable, threatened, and endangered species (VTE), may be considered as sensitive information that, if released or portrayed on maps may pose a threat to the existence, integrity, or health of those values. Sensitive information about values shall not be made available or accessible to the public. Where the availability of information could be considered as potentially detrimental to the existence of a value, the MNR shall determine whether or how the value can be depicted on a values map, and the type and extent of the information that can be provided to members of the planning team and to members of the local citizens committee (LCC).

Information protocols or agreements that describe conditions respecting the use or users of sensitive information, or restrict the availability of sensitive information, may be established with other agencies such as the Ministry of Tourism, Culture and Recreation (MTCR), the Natural Heritage Information Centre (NHIC), and native communities or First Nations. The MNR District Manager and the planning team must ensure that sensitive information about values is protected and used in accordance with any protocols or agreements established between the MNR and other agencies.

For the purpose of preparing a forest management plan, the District Manager appoints the members on the planning team and the members on the LCC, as described in the FMPM under Part A, Sections 1.2 and 3.2, respectively. The appointed members of both the planning team and the LCC are considered to be agents of the Crown for the purpose of fulfilling their duties in relation to preparing and implementing a forest management plan. Consequently, they are bound by MNR's obligations under FIPPA. Members of the planning team and LCC are also bound by any protocols or agreements that the MNR establishes with other agencies that describe the conditions by which the MNR agrees to use and protect sensitive information about values.

In the forest management planning process, planning for the protection of values normally requires both MNR and forest industry involvement. Therefore, the planning team or specific members of the planning team require access to information, including sensitive information, about values or in relation to values to ensure that roads and AOC planning occurs in accordance with Part A, Sections 2.3.8 and 2.4 of the FMPM. If the MNR determines that information about a value cannot be provided to SFL holders (plan holder) or members of the planning team, the MNR may instead provide the boundary of the area to be protected and/or any restrictions to forest operations. In these cases, the planning team must apply the protected area boundary or any restrictions when developing AOC prescriptions for sensitive values or planning road locations in accordance with the planning requirements in Part A, Sections 2.3.8 and 2.4, respectively, of the FMPM.

4.1.4.2 *Personal Information*

Personal information is defined in Section 2 of FIPPA. The MNR maintains personal information that is related to values information, such as a person's name, address, phone numbers, and other personal data associated with land use permits, trapline areas, baitfish areas, and other licenced or recognized natural resource uses. The MNR also maintains similar personal information related to the collector or provider of values information that is used for confirmation or verification purposes. The

MNR maintains personal information as part of its values information database. Personal information is considered to be sensitive, and must not be displayed on values maps or be made available or accessible to the public.

The MNR must acquire and declare consent to use personal information for forest management planning purposes from the persons providing their personal information. The MNR shall determine whether this information relating to values can be made available to SFL holders (plan holders), planning team members, or members of the LCC. The MNR must comply with FIPPA in terms of the treatment and use of personal information related to values that is used in forest management planning. Planning team members or members of the LCC, as agents of the Crown, must also comply with FIPPA in terms of their treatment and use of personal information for the purpose of fulfilling their obligations in forest management planning.

4.2 Standards for Values Information

The standards described in this section identify the information required to treat a value as a *known* value. This information consists of two parts: a geographic location and a basic description for each feature. Information that meets these standards is considered to be conclusive information that is required to confirm and verify the presence and characteristics of a value. Only known values shall be depicted on values maps and considered in forest management planning.

Information that meets these standards ensures that planning teams have sufficient background information to plan road locations and prepare AOC prescriptions to protect the existence, integrity, and health of the value. These standards are also used as a basis to confirm or verify the quality and accuracy of values information, as described in the roles and responsibilities in Section 4.3. Unless otherwise stated, these information standards apply to SFL holders (plan holders), other forest resource licence holders, and the MNR.

The MNR must determine whether the available information about a feature satisfies the standards and is sufficient to treat a value as a known value. The MNR will consider recommendations by the planning team when making decisions about values or in applying the precautionary principle, as described in Section 4.3.3.

The information maintained and managed by the MNR, with respect to an individual value, may exceed the mandatory information standards as described in this section. The digital information that is provided to SFL holders (plan holders) by the MNR must include all relevant information about values, with the exception of sensitive or personal information, as described in Section 4.1.4.

The MNR may enter into data collection arrangements with SFL holders (plan holders), other forest resource licence holders, or third parties for the purpose of obtaining values information, or for confirming or verifying existing values information.

4.2.1 Standards for Geographic Location

Values can be grouped into one of three spatial feature types based on their geographic description and their portrayal on the operational scale basemaps used for the management unit. Spatial feature types are point, line, and polygon.

Point Spatial Features

Values described by point spatial features have no perimeter, no area and no measurable length when portrayed on operational scale mapsheets. Examples of these values are raptor nests, mineral licks, outpost camps, trapper cabins, access points, approved boat caches, and hunt camps.

Line Spatial Features

Values described by line spatial features have no perimeter and no area, but do have a measurable length when portrayed on operational scale mapsheets. Examples of these values are intermittent streams, small streams, and recognized trails and portages.

Polygon Spatial Features

Values described by polygon spatial features have a measurable perimeter, a measurable area, and may have a measurable length when portrayed on operational scale mapsheets. Examples of values that are represented by polygon spatial features are registered trapline areas, baitfish areas, bear management areas, archaeological areas, cultural heritage areas, and fish spawning areas. Some values, such as permanent sample plots or research plots, may be represented as polygon features that have areas as small as 1/10 (0.1) of a hectare.

The technical specifications for values information, which are prescribed by the conditions in Section 4.5, may describe further standards for classifying certain values by spatial feature type.

4.2.1.1 *Standards for Coverages Containing Values Information*

Sustainable forest licence holders (plan holders) and the MNR will provide each other with coverages that contain geographic information about values in accordance with the requirements described in Section 4.1 and in a specific digital form as described by the conditions in Section 4.5. These spatial standards apply to SFL holders (plan holders) and the MNR but do not apply to other forest resource licence holders.

Geographic coordinates define the three dimensional, geographic location and spatial extent of a value and must be converted to planar coordinates when applied to a spatial values coverage. The geographic location and boundaries of a value or a group of values can be determined using various methods such as aerial photo-interpretation, analysis of satellite imagery, or collection of geographic coordinates from a global positioning system (GPS). These and other methods may be used to create coverages for new values or to correct or update information about existing values, provided that the information contained in these coverages meets the standards described in Section 4.2.

The geographic location and spatial extent of each value must be spatially referenced to existing planimetric base features such as lakes, rivers, roads etc., in coverages which have been provided by the MNR. The planimetric base features, which are used as geographic reference points, must be adjacent to, or in close proximity to, the values. Geographic information, that describes values in a coverage, must be created using the Tranverse Mercator map projection, the North American Datum for 1983 (NAD 83) adjustment for horizontal data, and where applicable, the Universal Transverse Mercator (UTM) coordinate system.

4.2.1.2 *Positional Accuracy Targets for Geographic Information*

The positional accuracy of coordinates for a geographic location is a determination of how close the mapped position of a feature is to its true position on the surface of the earth. Positional accuracy is represented as a certain distance (a radius) within which the location of a feature is expected to fall. The MNR maintains information about the positional accuracy for the geographic locations of all values in its values information database.

Positional accuracy is affected by the number of coordinates required to identify and represent the geographic location of a value, which will vary depending upon whether a value is a point, line, or polygon spatial feature type. The number of coordinates needed to represent a line or polygon spatial feature must be based on meeting the required positional accuracy for the feature. The positional accuracy of the geographic coordinates for known values, currently maintained in the Ministry's values information database, also varies based on the original data collection and data capture methodology.

The positional accuracy must be identified for each value from one of the following ranges:

- Within 2 metres
- Within 10 metres (target)
- Within 100 metres
- Within 500 metres
- Within 1,000 metres

The desired target for positional accuracy is within 10 metres or better for all spatial feature types. The standard for positional accuracy is within 100 metres for all values affected by planned or forecasted operations. The positional accuracy of a feature or boundary should be assessed using the same or similar method which was used to determine its original geographic location/extent.

The number of values which have a positional accuracy which meets the target for geographic information should improve with each successive forest management plan, as the priority to achieve the target applies to values affected by planned (including current operations) or proposed forest management operations.

The actual range of positional accuracy of coordinates for geographic locations must be determined and provided for all values, whether or not the target for positional accuracy has been met. The MNR will determine whether the positional accuracy for the geographic location of existing values is sufficient to map and locate the value, to treat the value as a known value, and to ensure that the value is considered in forest management planning. This determination will also identify values which require further confirmation and/or verification.

The geographic coordinates for all new values (previously unknown values), or corrections to known values (existing values), that are encountered during the implementation of forest management operations should be accurate to within 10 metres. The geographic coordinates for known values that are affected by proposed forest management operations, in the term of a plan that is under development, should also be accurate to within 10 metres.

The MNR will determine whether the positional accuracy for geographic information provided by SFL holders (plan holders) is acceptable, based on the target for positional accuracy and the need to acquire geographic information of sufficient accuracy to consider the protection of the value.

A hardcopy map identifying the geographic location of a value, using operational scale mapsheets for the management unit, must also be provided to the MNR by SFL holders (plan holders). Mapsheets must be of a quality that can be electronically scanned or digitized into a spatial computer record. Only the portion of the mapsheet, including the applicable UTM grid reference, which contains the geographic location of the value and the planimetric base features used to spatially reference the geographic location of the value are required. The MNR will use the hardcopy map to verify the accuracy and quality of the coverage for the value(s) which was created by the SFL holder (plan holder) in accordance with Section 4.2.1.1.

Other forest resource licence holders are also required to provide geographic information about values when new values or incorrect information about known values are encountered during the implementation of forest management operations. Other forest resource licence holders are only required to provide a hardcopy map, using operational scale mapsheets (or portions of mapsheet) including the appropriate UTM grid reference, for the management unit that identifies the location of the mapped value in relation to adjacent or nearby planimetric base features.

Other forest resource licence holders must also provide the range of positional accuracy of the mapped value based on the ranges previously described. The positional accuracy target, for geographic information provided by other forest resource licence holders, should be within 100 metres. The MNR will determine if the information provided is acceptable, based on consideration of the value and the positional accuracy targets. The MNR must also verify the geographic location of information provided by other forest resource licence holders. The MNR must create a digital coverage for these values in accordance with the spatial values coverage standards and the standards for positional accuracy as described previously in this section.

4.2.2 Basic Description of Values Features

The basic description of the features of a value must provide sufficient detail to allow planning teams to determine the appropriate AOC prescriptions and road locations in order to protect the existence, integrity, and health of a value. The basic description of the features of a value must consist of the following information:

- identification of the value by group, class, and feature type, based on the list of values contained in Appendix II
- method, survey type, or source of information that was used to identify and describe the value
- positional accuracy range
- name of person(s) who discovered, collected, and provided information about the value
- date the values information was collected
- description of the site conditions (i.e., steep slope, shallow soil – see management considerations attribute in Part B, Section 5.1.3) where the value exists
- specific characteristics about the value as identified in the technical specifications (see Section 4.5)

SFL holders (plan holders) must provide the basic description information for features in digital form while other forest resource licence holders must provide the basic description information in hardcopy form only.

4.2.2.1 *Quality Assurance and Source Data*

The quality and detail of information provided to the MNR will vary depending on the method used to collect the information (e.g., aerial photography, field survey). All geographic location and basic description information must be both confirmable and verifiable. The MNR must assess the quality and accuracy of geographic location and basic description information prior to entering the information into the values information database.

The MNR must also create additional information, such as an indication of the vulnerability of the value to forest operations, reference location of the source data and information, identification of sensitive or personal information, dates of confirmation, verification or revisions, native use, and other relevant data.

The MNR or SFL holders (plan holders) may request, and must be provided access to, the original data collected and/or the method used to determine the location and basic features of a value (source data). The source data or the data collection methodology will be used to verify or confirm the accuracy of the values information. Examples of source data and data collection methods may include, but are not limited to:

- supplementary aerial photography or large-scale photography, and the method of interpretation
- satellite imagery and imagery analysis
- results from ground inspections, surveys, cruises, tests, or studies
- data collected by a GPS
- any source information used to determine the geographic location or provide additional descriptive data about a value

The MNR shall treat the source data and the methodology used to determine the geographic location and basic description information, which is created by SFL holders (plan holders) or other forest resource licence holders, as the intellectual property of the provider. Source data may be used by members of the planning team or by members of the LCC for the purpose of forest management planning and will be treated in accordance with Part A, Section 1.4.2.

4.3 Roles and Responsibilities for Values Information

This section identifies the roles and responsibilities of the MNR, SFL holders (plan holders), and other forest resource licence holders associated with providing, receiving, and using values information. The terms *confirm* and *verify* represent the processes which are used to distinguish the roles and responsibilities of the MNR and SFL holders (plan holders) and other forest resource licence holders with respect to collecting and using values information in forest management planning.

The term *confirm* is used to describe the roles and responsibilities of the provider. The provider of values information must *confirm* that information collected and provided is accurate and meets the standards described in Section 4.2. The term *verify* is used to describe the roles and responsibilities of the receiver. The receiver must *verify* that the information received is accurate, meets the standards in Section 4.2, and is sufficient to determine road locations, develop Area of Concern (AOC) prescriptions, and protect those values when forest operations are conducted.

Confirmation precedes verification. In either role of confirmation or verification, the MNR is responsible for determining whether a value can be treated as a known value based on assessing the available information against the standards described in Section 4.2. The forest management guidelines prescribed in the *Forest Operations and Silviculture Manual* provide further direction for confirming, verifying, and considering values in forest management planning.

The roles and responsibilities of SFL holders (plan holders), other forest resource licence holders and the MNR to confirm and to verify the quality of information about a value, are described separately for timber and non-timber values.

4.3.1 Roles and Responsibilities for Timber Values

Sustainable forest licence holders (plan holders) or other forest resource licence holders are generally responsible for confirming the presence of timber values, and to collect and confirm information about those values.

The MNR is generally responsible for verifying the presence of known timber values and the information about those values, which has been provided by SFL holders (plan holders) or other forest resource licence holders. Verification is normally the responsibility of MNR district staff. Verification includes the determination that sufficient information exists to treat a value as a known value. Verification of timber values information can occur at various times throughout plan preparation or implementation, as described by the timelines in Section 4.4.

In some cases, the responsibility to manage certain timber values, such as research plots, tree improvement areas, genetic test areas, growth and yield plots, and other similar timber values may be shared between the MNR, SFL holders (plan holders), other forest resource licence holders, and/or third parties. In these cases, the parties involved must also share the responsibilities to confirm and verify the information.

In some cases, the MNR may own and/or is responsible for the management of certain timber values. In these cases, the MNR will ensure that information about timber values is collected and confirmed, and that this information is provided to SFL holders (plan holders) or other forest resource licence holders in accordance with Sections 4.2, 4.4, and 4.5. Sustainable forest licence holders (plan holders) or other forest resource licence holders must verify the presence of these timber values and information about these values prior to conducting forest operations.

Sustainable forest licence holders (plan holders) or other forest resource licence holders are responsible for providing information about new timber values, or corrections to information about known timber values, to MNR district offices when these values are encountered during the implementation of forest management operations. This information must be provided in accordance with Sections 4.2, 4.4, and 4.5. MNR district staff are responsible for verifying the accuracy and quality of the new or corrected timber values information provided by SFL holders (plan holders) or other forest resource licence holders.

MNR district staff are also responsible for entering and maintaining timber values information in MNR's values information database, and providing updates of this information to SFL holders (plan holders) or other forest resource licence holders in accordance with Section 4.4.

4.3.2 Roles and Responsibilities for Non-Timber Values

The MNR is responsible for confirming the presence of non-timber values, and ensuring that information about non-timber values is collected and confirmed. The MNR must ensure that information about non-timber values, which is provided to planning teams, is sufficient to determine road locations and develop AOC prescriptions. Part of this role requires MNR district staff to determine whether a non-timber value can be treated as a known value based on the available information and the standards described in Section 4.2.

Sustainable forest licence holders (plan holders) or other forest resource licence holders are responsible for verifying the presence of known non-timber values, and verifying information about those values, which have been provided by the MNR. Verification of non-timber values information, for values affected by planned or scheduled forest operations, must be done prior to conducting those operations.

Sustainable forest licence holders (plan holders) and other forest resource licence holders are responsible for providing corrections to information about known non-timber values that they encounter during the implementation of forest management operations. They are also responsible for providing information about new (previously unknown) non-timber values that they encounter and recognize during the implementation of forest management operations. Corrections to information about known non-timber values (existing) or information about new non-timber values must be provided by SFL holders (plan holders) or other forest resource licence holders in accordance with Sections 4.2, 4.4, and 4.5.

MNR district staff are responsible for verifying the accuracy of information about non-timber values provided by SFL holders (plan holders) or other forest resource licence holders. The MNR must verify that the information provided is accurate and meets the standards described in Section 4.2.

MNR district staff are responsible for entering and maintaining non-timber values information in MNR's values information database. They must also provide updates of this information to SFL holders (plan holders) and planning teams, or other forest resource licence holders as appropriate, in accordance with Section 4.4.

4.3.3 Precautionary Principle

The geographic location and basic description of a value must be available for the value to be considered as a known value. If a value does not have a geographic location, or if the basic description information about the features of a value does not exist or is incomplete, then the value cannot be mapped, will not be considered as a known value, and will not normally be considered in forest management planning. In some cases, sufficient information about the general location or partial description of the features of a value may be available such that the MNR may apply the *precautionary principle* to ensure that values are protected during forest management planning or implementation of forest management operations.

The precautionary principle, which will be considered for all values, is defined as follows:

> *In the absence of conclusive information to confirm or verify the presence or features of a value, this principle requires the consideration of the value in the planning of road locations and area of concern prescriptions in order to ensure that the value is protected, based on the high probability of its presence and the potential that it may be affected by forest management operations in a significant and negative way.*

The precautionary principle recognizes that some forest management activities may be detrimental to the existence, integrity, and health of some values or may cause irreparable damage to values. The rationale for applying the precautionary principle is to reduce the risks of significantly affecting a value in a negative way, in the absence of conclusive information about a value, and by considering values in forest management planning using the best available information about those values. The MNR may apply the precautionary principle, based on the appropriate rationale, to ensure that values are protected in forest management planning and during the implementation of forest operations.

Members of the planning team must consider the available information and may make recommendations as to whether sufficient information exists to treat the value as a known value. Members of the planning team may also make recommendations regarding the applicability of the precautionary principle and the extent to which the precautionary principle should be applied to ensure the protection of the value.

The MNR will determine which values will be considered in forest management planning based on considering the recommendations of the planning team and by assessing the available information against the standards described in Section 4.2. The MNR must also consider the recommendations from the planning team when making decisions regarding the application of the precautionary principle and in determining whether a value may be treated as a known value based on the available information.

The MNR may exercise reasonable latitude to designate a value as a known value, based on the availability of sufficient information, in order to ensure that it can be considered in forest management planning. In designating a value as a known value based on applying the precautionary principle, the MNR must provide SFL holders (plan holders) with this decision, an explanation of the concerns related to potential impacts from forest management, the rationale to support the decision, and the available information about the value. The MNR will not apply the precautionary principle to the extent that SFL holders (plan holders) or other forest resource licence holders become the de facto collector of information for non-timber values. The MNR District Manager is responsible for making these decisions and for ensuring that these decisions are carried out by the planning team.

4.3.4 Predictive Modelling

The MNR, with the assistance of SFL holders (plan holders), other forest resource licence holders and other parties, has developed an extensive values information database. However, not all values have been identified on Crown lands that are available for forest management. In order to assist in the identification of values on Crown lands, predictive models are being applied to identify the location of areas which may contain values based on the presence of specific landscape features that resemble the location and site conditions of, and have characteristics similar to, known values. The Cultural Heritage Resources Predictive Model, as described in the *Timber Management Guidelines for the Protection of Cultural Heritage Resources*, is an example of a predictive model that is used in forest management planning. The MNR must approve the application of any predictive models that are used to identify values for the purpose of forest management planning.

4.3.4.1 *Responsibilities of the Ministry of Natural Resources*

Predictive models are valuable tools that provide preliminary identification of high potential areas where values are likely to be present. Predictive models need to be continually re-calibrated to consider new information and to develop better trends or predictions from that information. The results produced from predictive modelling should not be used in isolation of further investigation. Further investigation or analysis is required to confirm the existence of values within the predicted area. The MNR is responsible for conducting this investigation or analysis, or for causing the investigation or analysis to be conducted.

The MNR will give priority to investigating or analyzing areas identified by predictive modelling that are located within, or are in close proximity to, proposed areas of forest operations. Based on the results of analysis, the candidate areas identified by predictive modelling will be reviewed and revised to identify the refined areas. The refined areas may then be declared as high potential areas.

High potential areas, which can be described by further information that meets the standards described in Section 4.2, will be treated as known values. The MNR is responsible for confirming that high potential areas will be treated as known values.

Further investigation or analysis of predictive modelling results cannot always provide the exact location or basic description of the features of a value that may exist within a high potential area to the standards described in Section 4.2. In this case, the MNR may apply the precautionary principle to designate high potential areas as known values, based on the availability of sufficient information needed to consider the appropriate protection for that value in forest management planning.

The MNR must also determine if the information produced by predictive modelling is considered to be sensitive information. The MNR will treat sensitive information in accordance with Section 4.1.4.

4.3.4.2 *Responsibilities of the Sustainable Forest Licence Holder (Plan Holder)*

Sustainable forest licence holders (plan holders) are required to verify that information about high potential areas, that has been confirmed and provided by the MNR, is accurate. However, verification is not required if SFL holders (plan holders) have accepted the AOC, as provided by the MNR, and have planned to apply the appropriate AOC prescriptions.

If SFL holders (plan holders) wish to modify the AOC or the prescription, as provided by the MNR, they are required to conduct further investigations in order to verify the presence or absence of values within, or in close proximity to, the proposed areas of forest operations. Sustainable forest licence holders (plan holders) will provide the MNR with the results of the investigation, which will be used to update the MNR's values information database and to re-calibrate predictive models.

4.3.4.3 *Assessment of Predictive Modelling Results*

The MNR will assess the information collected from the initial investigations (MNR responsibility to confirm high potential areas) and the information collected from further investigations (SFL holders/plan holders responsibility to verify the presence of a value) with the results produced from predictive modelling. The MNR will evaluate the reliability of the predictive models which are used to identify candidate high potential areas, using the information collected from both MNR and SFL holders (plan holders). The MNR is responsible for ensuring that predictive models are re-calibrated based on these evaluations.

4.4 Timelines for Values Information

Values information may be collected or provided at any time. Values maps and values information databases must be continuously updated by the MNR as information is assembled during the preparation and implementation of a forest management plan. Higher priority for collecting, confirming, providing, or verifying information must be given to values which are encountered in areas of current (active) or scheduled annual operations over values affected during the term of an approved forest management plan or a forest management plan under development. Lower priority for collecting, providing, confirming, or verifying information must be given to values that are not affected by proposed forest operations within the term of a forest management plan (beyond five years) and to values considered in longer term, strategic planning horizons of a plan (beyond 20 years).

4.4.1 Timelines for the Provision of Information for Values Affected by Current, Scheduled, or Planned Forest Management Operations

The timing of current, scheduled, or planned forest management operations that may potentially impact values in a negative way determines how quickly information about those values must be provided to the MNR and/or provided to SFL holders (plan holders). The following sections describe the timelines for providing values information when values are encountered through current, scheduled, or planned forest operations.

4.4.1.1 *Current Operations*

Current operations are forest management operations in an approved AWS that are presently active or that have commenced. Sustainable forest licence holders (plan holders) or other forest resource licence holders must provide information for any new values (i.e., previously unknown values) and corrected information about known values to the MNR when these values are encountered and recognized during the implementation of forest management operations. This information must be provided within three working days of encountering the value. The SFL holder (plan holder) and, where applicable, the Registered Professional Forester employed by the MNR, must determine whether the new value will be negatively affected by the forest management operations being conducted, and, if so, whether the operator must make appropriate adjustments to operations affecting the area where the value is encountered.

If the value may be negatively affected by current forest operations, the information described in Section 4.2 must be provided to the MNR by the SFL holder (plan holder) or other forest resource licence holder within two working days after the value is encountered. The MNR district staff must verify the accuracy of the information provided by the SFL holder (plan holder) or other forest resource licence holder within two working days of receiving the information. The planning team will consider the appropriate plan amendment, as required in accordance with Part A, Section 5.2 of the FMPM or consider revisions to the AWS in accordance with Part B, Section 3.5 of the FMPM.

The MNR district staff must update the values information database and produce an updated values map, in accordance with Section 4.1, showing the geographic location of the new value or relevant corrected information within fifteen working days of receiving the information from the SFL holder (plan holder) or other forest resource licence holder. If a plan amendment is required, the MNR district staff must provide the revised digital information to the SFL holder (plan holders) within 15 working days of their request for such information.

If new or corrected information about a value is provided to the MNR by someone other than an SFL holder (plan holder) or other forest resource licence holder, the Ministry must notify the SFL holder (plan holder) or the other forest resource licence holder responsible for conducting the operations within two working days of receiving the information. The same process as described in the preceding paragraphs will then apply.

4.4.1.2 *Scheduled or Planned Operations*

Scheduled or planned operations are forest management operations that have not yet commenced in accordance with the currently approved AWS or the currently approved forest management plan, respectively. The priority for collecting, confirming, providing, and verifying values information is given to values affected by forest management operations in the currently approved AWS over values affected by operations in the currently approved plan.

For scheduled operations, SFL holders (plan holders), other forest resource licence holders, or the MNR must provide values information in accordance with the requirements and standards described in Sections 4.1 and 4.2 when the values are encountered and recognized.

The timelines required to collect, confirm, provide, and verify information about values are dependent on the timing of scheduled operations. All efforts must be made to collect, confirm, provide, and verify values information prior to commencing the scheduled forest management operations. Once forest management operations commence, they are considered current operations and the timelines for providing values information described in Section 4.4.1.1 will apply.

The planning team must assess the potential impacts of scheduled forest management operations on any new values or values where information has changed. MNR district staff must update and revise any values information in the values information database and produce updated values maps for the revised or new values. Planning teams must consider the new or revised information about values and make any changes to road locations or AOC prescriptions, and consider the appropriate amendment or revisions as required in accordance with Part A, Section 5.2 or Part B, Section 3.5 of the FMPM, respectively.

Where new or revised information about values affects planned operations (i.e., operations beyond those in currently approved AWS but within the approved plan term), values information should be provided to SFL holders (plan holders) at least 30 working days prior to the submission of the next AWS. Sustainable forest licence holders (plan holders) will consider the values information and make appropriate changes to road locations or AOC prescriptions and consider the appropriate amendment as required in accordance with the FMPM, before scheduling any operations, in a new AWS, that are in the vicinity of the value.

4.4.2 Timelines for the Provision of Information for Values Considered in Forest Management Plan Development

Values information is assembled as part of the background information during the initial development of a forest management plan. Information about known values must be provided to the planning team by the MNR at the beginning of the forest management planning process. This information must be provided to the SFL holder (plan holder) at least two weeks prior to issuing the Invitation to Participate, in accordance with the terms of reference for a new plan. The MNR must also provide updates to information as new or revised data about values is assembled during plan preparation. Section 4.5 describes the format for providing values information.

Confirmation and verification of values and information about values normally occurs as part of the plan preparation process. For known values, road locations are determined and AOC prescriptions are developed in forest management plans in accordance with the planning requirements of the FMPM.

Any new information must be provided to SFL holders (plan holders) as it becomes available. This may occur at any time during the forest management planning process.

4.4.3 First Date of Effect for Provision of Digital and Hardcopy Values Information

The first date of effect for provision of values information, in digital form, for current, scheduled or planned operations, and as described by the requirements and standards in Sections 4.1 and 4.2 commences on January 1, 2002. The digital values information must be provided in accordance with the conditions described in Section 4.5. This first date of effect applies to both the MNR and SFL holders (plan holders).

For the purposes of preparing new forest management plans, beginning with plans which commence on April 1, 2004, the MNR must ensure that digital values information is provided to SFL holders (plan holders) at least two weeks prior to issuing the Invitation to Participate, as described in Section 4.4.2.

Prior to the first effective date for provision of digital values information, the MNR, SFL holders (plan holders) and other forest resource licences will provide each other with values information in a useable format in accordance with the requirements and standards described in Sections 4.1 and 4.2. This format may be in hardcopy (maps, descriptions, survey data, etc.) or in digital form. Both parties must consult with each other to determine the most efficient and cost-effective way to provide the required information.

4.5 Conditions for Values Information

All values information will be provided to SFL holders (plan holders) in a digital format by the MNR. The MNR will also ensure that updated values maps are produced in accordance with Part E and are provided to the appropriate planning team.

If the provision of information or the location of values could threaten the existence, integrity, or health of a value, as described in Section 4.1.4, the Minister may withhold such information. In these cases, the MNR District Manager must notify the SFL holder (plan holder) that certain information will not be provided on a values map and/or will not be provided to the planning team. The MNR, in consultation with the SFL holder (plan holder), will determine the kind of protection required for such a value.

The MNR must provide SFL holders (plan holders) with digital information about values for the purpose of forest management planning and SFL holders (plan holders) must provide the MNR with digital information about values, as prescribed by the *Technical Specifications for Providing Values Information*.

Where appropriate, the MNR will provide other forest resource licence holders with values information for the purpose of conducting forest operations in accordance with an approved forest management plan. The MNR district office staff and the other forest resource licence holders will determine the most appropriate and effective form for providing this information. Other forest resource licence holders are only required to provide MNR with values information in hardcopy form (maps and descriptions) as described by the requirements and standards in Sections 4.1 and 4.2 respectively.

All information provided to SFL holders (plan holders) or other forest resource licence holders may only be used for the purpose of forest management planning or for fulfilling their licence obligations under the CFSA. The digital requirements for values information, as described in the technical specifications, must be consistent with the requirements, standards, roles and responsibilities, and timelines described in this section.

5.0 FOREST RESOURCES INVENTORY

An inventory of forest resources must be created and maintained for each designated forest management unit in the province of Ontario. An FRI is a composite information product which is assembled from a collection of individual geographic information coverages. An FRI provides a description of all areas within a forest management unit and provides a snapshot in time of the characteristics of water and landbase geography.

Forest resources inventory information is used to support various forest management planning and land-use planning decisions over a wide range of geographic areas (extents). The geographic areas can vary from individual forest stands, which represent small areas (less than a hectare to hundreds of hectares) to forest level, management unit, mill woodshed, and landscape extents, which involve very large areas (thousands or millions of hectares). In some cases, the quality of forest management planning decisions can be linked to the quality of information maintained and updated in the FRI.

An FRI is created when the area within a management unit is delineated and classified based on its geographic features and characteristics into homogeneous water and land types called polygons. All polygons in an FRI must have a geographic location, referred to as a *spatial* component, and a description of each polygon's characteristics, referred to as a descriptive or a *tabular* component. Information that identifies the geographically referenced locations and boundaries of the polygons are referred to as spatial attributes. Information that describes the characteristics of a polygon is referred to as tabular attributes.

Forest resources inventories represent information products that are composed or built from a specific collection of individual geographic information coverages. Each coverage represents a different geographic theme such as water, wetlands, ownership, transportation, or forest cover. The spatial and tabular information maintained in these coverages portray and describe the unique features related to each theme. The individual coverages within the collection can be combined to create snapshots of an FRI at any point in time, according to a set of process rules. The requirements and standards described in this section apply to spatial and tabular information in each of the individual coverages within an FRI collection. This section also describes the requirements to assemble information from the individual coverages in the collection to form an FRI information product (a composite snapshot).

Sustainable forest license holders (plan holders) must provide information to create two types of FRIs for Crown lands on forest management units within their licensed areas: a *Stewardship Inventory* and a *Planning Inventory*. The MNR must ensure that SFL holders (plan holders) are provided with FRI information for non-licenced areas within a forest management unit. The FRI for non-licenced areas within a designated management unit must be compatible with the stewardship inventory and must contain sufficient information for planning teams to prepare forest management plans in accordance with the FMPM.

The stewardship inventory provides a current description of the area within a forest management unit, based on actual measurements and collections of forest cover data. The planning inventory is created from the same basic information components as the stewardship inventory, but also contains additional information that supports the development of forest management plans and reflects decisions made in approved plans. These inventories form the most significant component of background information used in forest management planning on Crown lands in Ontario. The planning and the stewardship inventories also constitute the greatest demands for information requirements prescribed by the FIM.

Forest resources inventories are based on a standard map projection and coordinate system, a common set of planimetric base features (such as water, wetlands, ownership and land tenure, parks and reserves, and roads) and a common area classification process used to delineate the different water and land types into polygons. Planimetric base features are combined into an inventory base fabric and the remaining area is delineated into different polygons based on the homogeneity of forest cover and vegetation (referred to as area classification). The area classification process creates a key forest cover description layer called the forest polygon coverage. The forest polygon coverage contains updated inventory base features information along with updated information based on forest management activities and natural changes. The requirements for maintaining and updating information in each of the inventory base features coverages and the process to create, maintain and update a forest polygon coverage, required in both the stewardship and planning inventory collections, are described in Section 5.1.

The mandatory requirements, standards, roles and responsibilities, timelines, and conditions for the provision of information required in the stewardship inventory collection are described in Section 5.2. The process to create the stewardship inventory information product is also described in Section 5.2.

The mandatory requirements, standards, roles and responsibilities, timelines and conditions, for information required in the planning inventory collection, are described in Section 5.3. The process to create and the requirements to provide the planning inventory information product are also described in Section 5.3.

The requirements, standards, roles and responsibilities, timelines, and conditions to produce and provide FRI information in accordance with this manual apply only to Crown lands within designated forest management units, as defined in Section 7 of the CFSA. The information requirements and standards for the stewardship and planning inventories do not apply to the area considered as southern Ontario and the area considered as north of 51° latitude (northern boreal initiative). Both of these areas are outside of the Area of the Undertaking as defined by the *Class Environmental Assessment for Timber Management on Crown Lands in Ontario*. The information needs for FRI in these areas had not yet been fully defined when this manual was written.

5.1 Composition of the Forest Resources Inventory

Forest resources inventories are created from three fundamental components:

a) A standard geodetic datum, map projection, and coordinate system
b) A specific set of planimetric base feature coverages
c) A system to classify area into homogeneous polygon types

Each of these components is common to both the stewardship and the planning inventories.

The MNR utilizes the North American Datum for 1983 (NAD83) as its standard geodetic datum for the production and maintenance of geographic information and mapping products. The MNR is currently in a transition period of converting from the NAD27 (Ontario 76 Adjustment) geodetic datum standard to the NAD83 standard. The Universal Transverse Mercator (UTM) system is the standard map projection used to project the locations (geographic coordinates) of features on the Earth's surface (in three-dimensions) onto a planar surface (in two-dimensions). Currently much of the FRI information in Ontario utilizes the UTM system to determine planar coordinates that provide a geo-referenced location for each individual polygon in an FRI coverage. The requirements for geodetic datum, and the map projection and coordinate system are described in Section 5.1.1.

The stewardship and planning inventories are composed of collections of specific planimetric base features, such as water, wetlands, ownership and land tenure, and parks and reserves, which are organized and maintained in individual coverages. Planimetric base features which form part of forest resources inventories are referred to as inventory base features. The collection of inventory base feature coverages provides the foundation or base fabric for creating and maintaining FRI information. The information in each of the inventory base feature coverages must be updated and maintained within their respective coverages so that an FRI snapshot can be created with the most current information at any time. The information requirements for each of the inventory base feature coverages required in the stewardship and planning inventory collections is provided in Section 5.1.2.

The inventory base features provide only a preliminary classification of a given geographic area into water polygons and a few types of land polygons (primarily wetlands). The area on a forest management unit requires further classification into different non-forested and forested polygon types. A description must then be created for each forested polygon to complete the current forest condition as described in Section 2.2.2.3 of the FMPM. Forest description information is maintained in the forest polygon coverage. This coverage provides the basic definition and the key forest cover layer in an FRI. The classification of the area within forest management units for the purpose of creating the forest polygon coverage is described in Section 5.1.3.

5.1.1 Datum, Map Projection, and Coordinate System Requirements

For the purposes of planning and mapping, geographic information is normally transformed to a standard map projection system. For the purposes of forest management planning in Ontario, the locations of spatial features are transformed from their actual three-dimensional location on the surface of the earth (an ellipsoid form) to a two-dimensional representation (a plane) on a map using the UTM map projection system. Three-dimensional locations of features on the surface of the earth are measured in latitude and longitude and are referred to as geographic coordinates, which are adjusted by vertical and horizontal datum. Two-dimensional representations of geographic coordinates are referred to as planar coordinates and are determined using a Cartesian coordinate system which is defined by x and y axes.

5.1.1.1 *Vertical and Horizontal Datum Requirements*

Geographic coordinates are determined using a standard reference system of fixed, vertical, and horizontal control points which have been established on the surface of the earth. This system of established control points is referred to as horizontal and vertical geodetic datum. A network of control points is established across North America and provides a spatial reference for determining coordinates for all other features.

Vertical geodetic datum, used to reference heights or elevations, is related to tide gauge stations located on the North American coastline. These tide gauge stations were held fixed to an elevation of zero during the establishment and adjustment of leveling networks across North America. Part of these North American leveling networks, form the Canadian Geodetic Vertical Datum, 1928 (CGVD28). The control points and benchmarks that form the CGVD28 leveling networks are thus related to Mean Sea Level (MSL). Elevations shown on topographic maps are, therefore, referred to as heights above MSL. The CGVD28 is the vertical geodetic datum standard prescribed by this manual for referencing height and elevation data.

The NAD83 horizontal geodetic datum is the standard that the MNR has recently adopted for referencing geographic information and is the horizontal datum standard used for all geographic information prescribed by the FIM. The MNR has converted all planimetric base features and values data, which are maintained in the MNR's values information system, from NAD27 (Ontario 76 Adjustment) to NAD83. The NAD83 standard represents a more precise and modern global horizontal geodetic datum. Inventory base features such as lakes, rivers, wetlands, management unit boundaries, and values are now maintained using the NAD83 standard.

At the time that FIM was being developed, most FRI information was created and maintained using the NAD27 datum for geographic information. Most SFL holders (plan holders) were also utilizing geographic information (related to forest resources inventory, planimetric base features, and values) based on the NAD27 datum standard.

The conversion of geographic data from NAD27 (Ontario 76 Adjustment) to NAD83 will require a one-time transition period based on when the first FRI is required in accordance with this manual. The timing of the transition period will be based on the timelines for when either the stewardship inventory or the planning inventory is required in accordance with this manual. The MNR will consult with SFL (holders) plan holders to determine the most appropriate timeline in which to make the transition (NAD27 to NAD83), based on minimizing the impacts and based on meeting the requirements and timelines for FRI information prescribed by this manual.

The provincial and national standard for conversion of geographically-referenced data from NAD27 (including the MAY76 Readjustment) to NAD83 is the National Transformation version 2 (NTv2). All geographic information which is required as part of creating an FRI, as described by the requirements and timelines in this manual, must be converted from the NAD27 (MAY76 Readjustment) to NAD83 using the NTv2 procedure.

In order to move to the NAD83 datum standard, the MNR will provide SFL holders (plan holders) with a standard procedure to convert NAD27 data to NAD83 data, and vice versa, or MNR will perform the conversions on their data in order to meet the requirements for geographic information prescribed in the FIM. Once an FRI has been converted to the NAD83 standard, SFL holders (plan holders) are required to provide all geographic information, as prescribed by the FIM, using NAD83 from that point on.

5.1.1.2 *Map Projection and Coordinate System Requirements*

The UTM projection system provides a basis for referencing geographic coordinates in three dimensions to planar coordinates in two dimensions. The UTM map projection system is a recognized standard for determining planar coordinates for geographic information prescribed by the FIM.

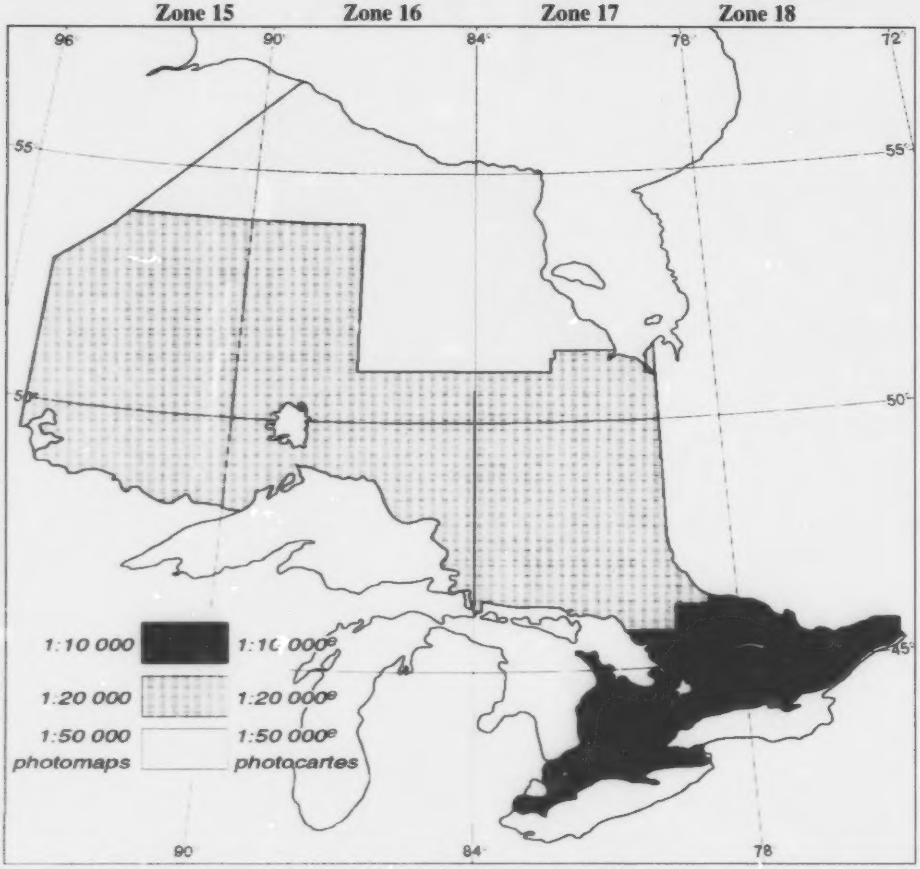
The earth is represented and partitioned into unique UTM zones, which span six degrees of longitude each. Ontario spans four longitudinal UTM zones (covering 24° of longitude). In Ontario, the UTM zones are numbered from 15 to 18 and represent the 15th to the 18th six degree zones, to the east of 0° longitude (the Prime Meridian). The UTM coordinate system is a standard by which the location of planimetric base features, values, and polygons in an FRI are geographically related to the surface of the earth. Figure B-2 shows the UTM zone coverage for Ontario.

Each UTM zone is subdivided into mapsheet tiles or grid squares, which are used to define the boundaries of mapsheets or basemaps. Mapsheets provide convenient mapping scales which are used to portray different types information on hardcopy maps such as; planimetric base features, values, planned or reported forest management activities, and FRI.

In the past, mapsheet tiles also provided a convenient basis for storing and transferring geographic information (planimetric base features, FRI) due to the limitations of computer storage and media capacity. With current computing capabilities, however, geographic information no longer needs to be stored, maintained, and transferred based on individual mapsheet tile coverages. As a result, MNR now stores and maintains planimetric base features and values information in seamless coverages, which are not subdivided by mapsheet tile boundaries, but are based on the geographic area of each MNR administrative district. However, mapsheet tiles are still used to maintain and transfer spatial FRI information and also provide a system for determining planar coordinates which are used to geo-reference FRI features (polygons).

Mapsheets are produced at three different scales (1:50,000, 1:20,000 and 1:10,000) depending on their location within Ontario as shown in Figure B-2. Mapsheets in the most northern part of the province (e.g., north of 51° latitude) are produced at a scale of 1:50,000. At the time the FIM was being written, all 1:50,000 photogrammetic maps were not in digital form. However, these maps are not used as base feature information for the purpose of creating and maintaining FRI information for designated management units, as prescribed by this manual.

Figure B-2 UTM coordinate system and corresponding mapsheet scales used to portray geographic features in the province of Ontario.



Mapsheets in the northwestern and northeastern parts of Ontario are produced at a scale of 1:20,000 and cover an area of 100 square kilometres (10,000 metres by 10,000 metres). Mapsheets in the southern part of Ontario are produced at a scale of 1:10,000 and cover an area of 25 square kilometres (5,000 metres by 5,000 metres). These two mapsheet scales (1:20,000 and 1:10,000) are also referred to as operational scale mapsheets and are used to portray planned or actual forest management operations on map products using FRI information as a base.

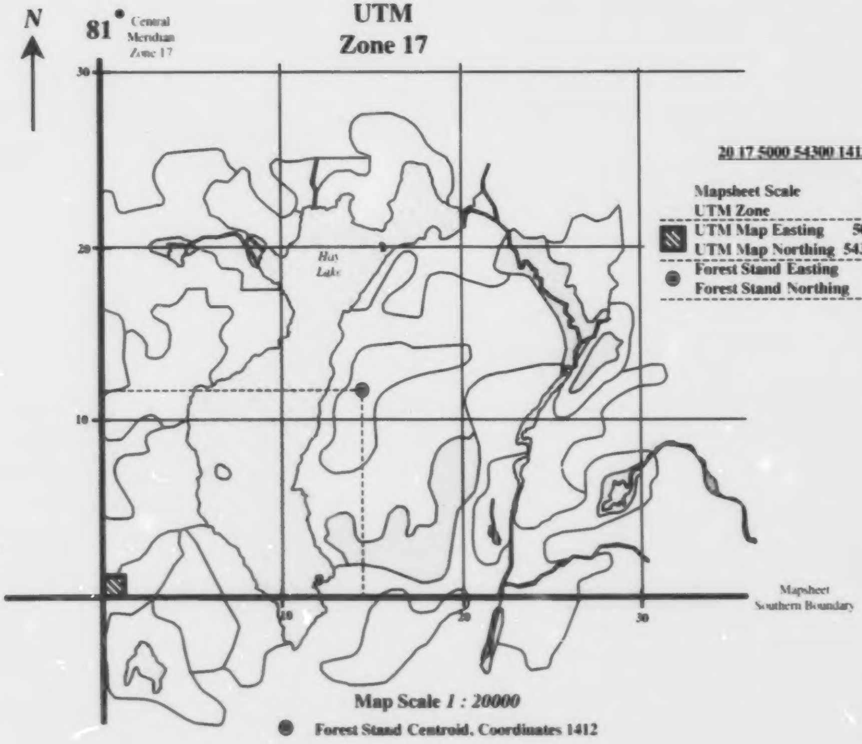
Within each UTM zone, mapsheet tiles are arranged in a grid pattern starting along the middle longitude (called a central meridian) of the zone and placing the mapsheet tiles in east and west directions until they meet each UTM boundary. The location of a mapsheet is identified by the pair of coordinates located at the southwest corner of the mapsheet tile. These coordinates identify the distance in metres in relation to the central meridian of a UTM zone (called an easting) and the distance in metres north from the equator (called a northing).

The central meridian of each UTM zone is assigned a false easting value of 500,000 metres. Therefore, mapsheets (and coordinates on those mapsheets) located to the west of a central meridian have easting values less than 500,000 metres and mapsheets to the east have values greater than 500,000 metres. There cannot be negative values for easting coordinates within a UTM zone.

In some cases, the boundary of a forest management unit (which defines the geographic extent of an FRI) straddles two UTM zones. The technical direction for maintaining geographic information in an FRI, which straddle two UTM zones will be described in the technical specifications as prescribed by the conditions for each inventory requirement (stewardship and planning inventory).

Sustainable forest licence holders (plan holders) may maintain spatial information in the stewardship and planning inventory collections which is geo-referenced using the UTM coordinate system. In this system, polygons in an FRI are uniquely referenced based on their geographic location within each mapsheet tile. Most forest resource inventories utilize the polygon centroid as the unique geo-referenced identification for a polygon. An example of the UTM coordinates of a polygon centroid (center of a polygon) is illustrated in Figure B-3. Figure B-3 also shows an example of how the UTM coordinate system is used to identify the coordinates of a mapsheet (scale of 1: 20,000) located along the central meridian of Zone 17 (81° longitude).

Figure B-3 Illustration of the UTM grid system used to determine the geo-referenced coordinates of a polygon (a polygon centroid).


N
81° Central Meridian Zone 17
UTM
Zone 17
30
20
10
10
20
30
Hay Lake
20 17 5000 54300 1412
Mapsheet Scale 20
UTM Zone 17
▨ UTM Map Easting 5000
UTM Map Northing 54300
● Forest Stand Easting 14
Forest Stand Northing 12
Mapsheet Southern Boundary
Map Scale 1 : 20000
● Forest Stand Centroid, Coordinates 1412

Sustainable forest licence holders (plan holders) may also choose to maintain and provide polygon identification numbers that are not geo-referenced, as described in Section 5.1.3.2.2, or that are based on a seamless coverage design, as described in Section 5.1.1.3. If polygon identification numbers are not geo-referenced by mapsheet tile or are not geo-referenced, the polygon identification must be uniquely assigned within the coverage (map extent) and the methodology used to identify each polygon must be documented and provided to the MNR.

5.1.1.3 *Seamless Coverage and Alternate Geo-Referencing Concepts*

In the past, the rationale for defining a mapsheet tile as a map extent, and the process of maintaining and using FRI information, was restricted by limitations of computer storage, memory, media, and processing speed. Computer technology is becoming less of an obstacle in terms of these limitations. Consequently, at the time the FIM was written, the concept of producing and maintaining spatial information in larger seamless coverages (versus mapsheet tile-based coverages) was becoming a reality.

A seamless coverage is defined by a map extent within which all spatial features are formed by contiguous lines that describe the geographic features within the area of the map extent. A coverage is considered to be seamless when the geographic features within the defined map extent for a given theme are not formed, bisected, or interrupted by administrative boundaries (seams), such as mapsheet tile, township line, management unit line, MNR administrative district boundary, etc. The area of the map extent used to represent a theme is the geographic frame of reference for any seamless coverage.

The MNR currently maintains planimetric base features and values information in seamless coverages, defined by MNR administrative districts. Therefore, each MNR administrative district boundary forms the map extent for seamless values coverages. However, these district values coverages are not seamless with respect to each other or with respect to larger geographic areas such as MNR administrative region, forest region, or the province of Ontario. The MNR is moving towards seamless provincial coverages for planimetric base features and values information.

At the time of writing the FIM, most FRI information had traditionally been maintained on a mapsheet tile basis, whereby two separate polygons are created for a single forest stand that straddles a mapsheet tile boundary. Each part of the forest stand, on either side of the mapsheet boundary, is given a unique polygon identification number (normally a geo-referenced polygon centroid). The mapsheet tile, in conjunction with the UTM projection and coordinate system, provides a methodology for geo-referencing polygons in an FRI. Even within the same mapsheet tile, a forest stand may be further bisected by ownership and land tenure, parks and reserves or other administrative boundaries. This results in the formation of two or more polygons with the same attributes (descriptions) but different geo-reference numbers.

In the near future, FRI will likely be maintained in seamless coverages based on larger geographic areas, such as a designated forest management unit. If mapsheet tiles are no longer used to form polygon boundaries in an FRI, the mapsheet tile number may no longer be required as part of the geo-referenced location of a polygon. A seamless FRI, based on a designated forest management unit boundary (map extent), would also contain fewer polygons since polygons which were created by mapsheet tile boundaries would be joined to form single polygons. Seamless forest resource inventories would ultimately look, and be maintained, differently.

Sustainable forest licence holders (plan holders) may provide FRI information in seamless coverages, as described by the standards in Section 5.1.3.2.1.

5.1.2 Inventory Base Feature Information

The following sections describe the requirements for updating and maintaining inventory base feature information required for the stewardship and planning inventory collections. These requirements apply to SFL holders (plan holders) and the MNR.

The stewardship and planning inventory collections include the following planimetric base feature coverages which are collectively referred to as inventory base features information:

- Water (polygons)
- Wetlands (polygons)
- Designated Forest Management Units (polygons)
- Ownership and Land Tenure (polygons)
- Parks and Reserves (polygons)
- Forest Polygon (polygons)
- Centre-line Features (linear features which are used to generate polygon areas)

Figure B-4 shows the common planimetric base feature coverages that are incorporated into both the stewardship inventory and the planning inventory information products. The planning inventory collection also includes other information and coverages which contain planning decision information, planned harvest areas, AOC reserves, and corridor locations for planned road construction.

Inventory base feature information is maintained in separate spatial layers within the MNR's values information system. The names applied to the different planimetric base feature coverages in the stewardship and planning inventory collections are used only to describe the type of information required. These coverages may not have the same formal names or organization of attributes as the individual layers which are maintained by MNR.

Figure B-4 indicates a set of process rules which are used to assemble the inventory base feature information into stewardship and planning inventory information products. The process rules needed to create these FRI information products are described in technical specifications as prescribed by the conditions in Sections 5.2.5 and 5.3.5 (stewardship inventory and planning inventory, respectively).

Figure B-4. Relationship between inventory base feature information maintained in individual planimetric base feature coverages, referred to as a collection of coverages, and FRI information products (stewardship or planning inventory information product), referred to as snapshots.

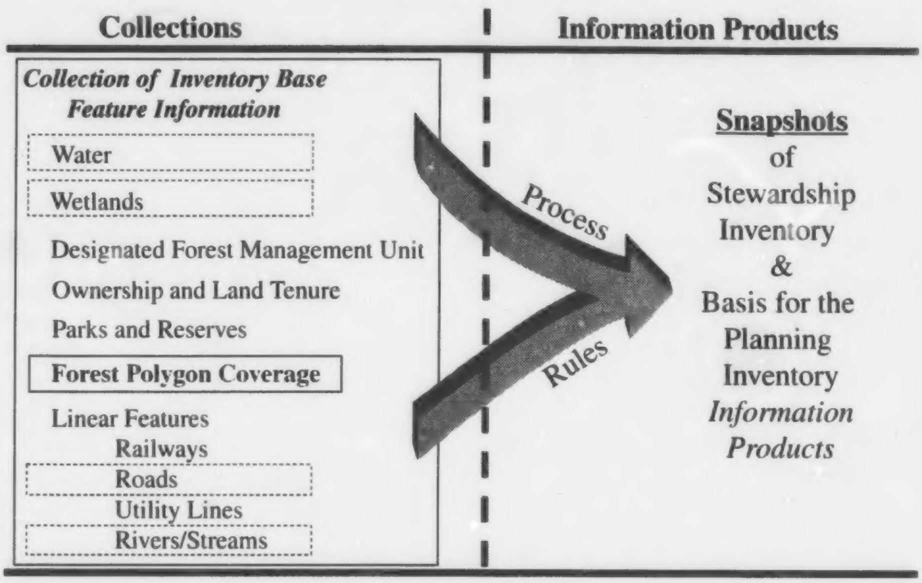

Collections
Information Products
Collection of Inventory Base Feature Information
Water
Wetlands
Designated Forest Management Unit
Ownership and Land Tenure
Parks and Reserves
Forest Polygon Coverage
Linear Features
Railways
Roads
Utility Lines
Rivers/Streams
Process
Rules
Snapshots of Stewardship Inventory & Basis for the Planning Inventory Information Products

Figure B-4 also indicates the extent of the requirements for SFL holders (plan holders) to provide certain inventory base feature information in accordance with Section 5.1.2.1. Planimetric base features coverages which are outlined with a solid rectangle indicate that SFL holders (plan holders) are required to provide all information for the licensed area of Crown lands within a designated forest management unit. Planimetric base features which are outlined with a dashed rectangle indicate that SFL holders (plan holders) are required to provide a specific subset of the information for the licensed area of Crown lands within a designated forest management unit. Sustainable forest licence holders (plan holders) are not required to provide information for planimetric base features coverages which are not outlined with a rectangle; the MNR will ensure that SFL holders (plan holders) are provided with this information.

Water

The water planimetric base feature coverage contains polygons of different water types (water bodies) such as lakes, ponds, rivers, large streams, or reservoirs. The water polygons in this coverage contain different types of line segments (referred to as water body segments such as shorelines, river edges, etc.).

Wetlands

The wetlands planimetric base feature coverage contains polygon features that identify lands that are either seasonally or permanently flooded by shallow water. Wetlands may also include lands where the water table is close to the surface. In either case, the presence of abundant water causes the formation of hydric soils and favours the dominance of either hydrophytic or water tolerant plants as designated through the wetland evaluation process or a wetlands ecosystem classification. Wetland polygon types can be classified as being predominantly a bog, fen, marsh, or swamp. Some wetland polygon types may have trees present. A wetlands coverage may not be available for all designated forest management units in the province.

Designated Forest Management Units

This planimetric base feature coverage contains polygons that represent the legal boundaries of forest management units in Ontario designated under Section 7 of the CFSA. Designated forest management units are geographical representations produced from the legal metes and bounds description and interpretation of these boundaries. An FRI must be prepared for each designated forest management unit in accordance with this coverage. The MNR maintains the boundary information in the designated forest management unit coverage. The boundaries of designated forest management units define the map extents for each forest polygon coverage, as well as the map extent for the stewardship and planning inventory information products.

Ownership and Land Tenure

Ownership and land tenure information may exist in a composite coverage or in individual coverages. This coverage(s) identifies the boundaries of ownership and designated land uses (land tenure) based on legislation, legally defined boundaries, and licenced/recognized resource uses for all area within a forest management unit. This coverage(s), in combination with the Parks and Reserves coverage, is used to indicate the custodian (SFL holders/plan holders or the MNR) responsible for creating and maintaining FRI information, in accordance with the requirements and standards described in Section 5.1.2.1 and Section 5.1.2.2.

This coverage(s) indicates different types of ownership, such as patent (private), Crown, Federal etc. Land tenure identifies various types of Crown land leasing or licensing arrangements. In some cases, patent lands are further subdivided, based on the ownership of the timber on those lands. The Crown may own the rights to the timber, in whole or in part, on some patented lands. Patented lands, which are subject to Crown timber rights, are not part of the managed Crown forest area within a forest management plan.

Implementation of Ontario's Living Legacy land use strategy and the Forest Accord will have an impact on the classification of land tenure and land use designations. This coverage(s) will be updated and expanded as new information becomes available.

Parks and Reserves

Parks and reserves are public lands (normally Crown lands) that are legally defined through legislation for the purpose of protecting natural features, landscapes, and wilderness areas. Parks and reserves are regulated by legislation such as the *Provincial Parks Act* or the *Public Lands Act*, and are classified into three land use designations: Provincial Parks, Conservation Reserves, and Forest Reserves. Collectively referred to as parks and reserves, these land-use designations must be used in conjunction with the ownership and land tenure information to identify the custodian responsible for providing FRI information in accordance with the FIM.

The result of implementing Ontario's Living Legacy land use strategy and the Forest Accord will have an impact on the various land use designations for parks and reserves. This coverage will be updated and expanded as new information becomes available.

Forest Polygon

The forest polygon coverage is comprised of polygon features only and provides the primary description of forest cover in an FRI. The designated forest management unit coverage provides the map extent and geographic boundaries for each FRI. The polygon features contained in the water, wetlands, ownership and land tenure, and the parks and reserves coverages define a preliminary set of polygons in the forest polygon coverage. All remaining land area within a designated forest management unit must be classified into non-forested and forested land types. The classification of the area for the purpose of creating a forest polygon coverage is described in Section 5.1.3.

Centre-line Features

Centre-line features represent the centre of a linear feature, such as the centre line for a road corridor or a gas pipeline. These coverages represent linear features, such as transportation routes, railways, utility lines, small rivers, streams, and creeks. Centre-line features are not included in the forest polygon coverage. However, polygons, which are created from the buffering of centre-line features, are added to the completed forest polygon coverage during the creation of a stewardship or planning inventory information product.

5.1.2.1 *Requirements for Inventory Base Feature Information*

The MNR will ensure that SFL holders (plan holders) are provided with the best available inventory base feature information, in digital form, for the following planimetric base feature coverages for the purpose of updating the stewardship or planning inventory collections:

- Water
- Wetlands

- Designated Forest Management Units
- Ownership and Land Tenure
- Parks and Reserves
- Centre-line Features (roads, railways, utility lines, small rivers and streams)

The MNR will ensure that digital inventory base feature information is provided to SFL holders (plan holders) in accordance with the standards described in Section 5.1.2.2 and the conditions described in Section 5.1.2.5.

Sustainable forest licence holders (plan holders) must incorporate updates to inventory base feature information provided by the MNR into the stewardship and planning inventories (primarily the forest polygon coverage). Sustainable forest licence holders (plan holders) are required to provide inventory base feature information for new features (previously unknown) or corrections to exiting features, for the following planimetric base features, as they are encountered through forest management planning or during the implementation of forest management operations on Crown lands:

- Water
- Wetlands
- Centre-line Features (linear features for Crown forest access roads, small rivers and streams only)

Sustainable forest licence holders (plan holders) are only required to collect and provide a mandatory subset of inventory base feature information, as described in section 5.1.2.2, based on the information required in a forest polygon coverage. The requirements for SFL holders (plan holders) to provide inventory base features information apply only to the licenced Crown lands within a designated forest management unit and do not affect the information requirements for values (see Section 4.0), which may be associated with, or are part of, inventory base features.

Sustainable forest licence holders (plan holders) must provide updates to inventory base feature information with submission of the stewardship inventory collection or the planning inventory collection in accordance with Section 5.2 and Section 5.3, respectively. Sustainable forest licence holders (plan holders) are not required to provide updates to water, wetlands or centre-line features for Crown forest access roads, small rivers, and streams on a more frequent basis than is described by the timelines in Section 5.1.2.4. However, SFL holders (plan holders) are encouraged to provide updates to these inventory base features at any time as they are encountered during the implementation of forest management operations.

Sustainable forest licence holders (plan holders) are not required to provide information about wetland features in a new or separate wetlands base feature coverage if a wetlands coverage does not already exist. In this case, SFL (plan holders) must classify the wetlands features into the appropriate non-productive forest polygon type within the forest polygon coverage, as described in Section 5.1.3.2.2.

If a wetlands base feature coverage does exist, SFL holders (plan holders) are only required to provide the change or update to the spatial boundaries of the affected wetland features along with the appropriate non-productive forest polygon classification for each wetland polygon (see Section 5.1.3). This only applies to wetland features that are encountered during forest management planning or the implementation of forest management operations. Sustainable forest licence holders (plan holders) must provide the spatial update information and non-productive polygon classification with the wetlands base feature coverage. The MNR will verify the spatial information provided by SFL holders (plan holders) and ensure that the correct wetlands polygon classification, as described by the standards in Section 5.1.2.2, is incorporated into the updated wetlands base feature coverage.

Sustainable forest licence holders (plan holders) are not required to conduct an evaluation of wetland features or a wetland ecosystem classification survey. However, if SFL holders (plan holders) apply a wetlands ecosystem classification system on their licenced areas, the wetlands ecosystem type must be provided as part of the wetlands base feature information. Where a wetlands base feature coverage exists, the wetland features must also be reclassified into the appropriate non-productive forest polygon type, when transferred to the forest polygon coverage, as described in Section 5.1.3.2.2.

Sustainable forest licence holders (plan holders) are also required to provide updates of changes to active forest access roads within the roads centre-line coverage. The MNR will ensure that Crown forest access roads which are not actively used or maintained by SFL holders (plan holders) in accordance with a forest management plan are updated in the roads centre-line base feature coverage. The requirement to update Crown forest access road information in the roads centre-line base feature coverage is based on responsibilities of either the Crown or SFL holders (plan holders) to maintain, use, abandon, or restrict access on Crown forest access roads. These responsibilities vary between forest management units across Ontario.

Inventory base feature information must be updated and maintained in separate planimetric base feature coverages and must include a spatial and tabular information component for each feature within their respective coverages. Only the spatial features and the corresponding tabular attributes which are new, or have changed, must be provided. However, a complete planimetric base feature coverage which identifies the changed data may also be provided. In either case, the MNR will verify the updated information in accordance with Section 5.1.2.3. The MNR will also create a process to describe how change information (for inventory base features), once verified, will be accepted and incorporated into the updated planimetric base feature coverage. This process will be described in the *Technical Specifications for Providing Forest Resources Inventory Information*.

Only a subset of the information maintained for each polygon within the water, wetlands, designated forest management units, ownership and land tenure, and the parks and reserves coverages is required to create the base fabric for the forest polygon coverage. Updates to each of these planimetric base features coverages must occur before the forest polygon coverage is created. The requirements for creating the forest polygon coverage using the updated planimetric base feature coverages, and the classification of the remaining area within a forest management unit, are described in Section 5.1.3.

The MNR will ensure that updates to inventory base feature information that are provided by SFL holders (plan holders) are verified (accepted) and incorporated into the appropriate planimetric base feature coverages. The MNR must provide SFL holders (plan holders) with updated planimetric base feature coverages, in digital form, for the purpose of updating and maintaining FRI information or for the purpose of forest management planning.

5.1.2.2 *Standards for Inventory Base Feature Information*

This section describes the spatial and tabular information standards for inventory base feature information, as described by the requirements in Section 5.1.2.1. The spatial component describes the geographic location and extent of inventory base features. The tabular component provides a description of each spatial feature (polygon or linear features).

Changes to spatial inventory base feature information, including the addition of new inventory base features, must be geographically referenced to existing (known) base features within their respective planimetric base feature coverages. The target for positional accuracy of the spatial inventory base features information should normally be within 10 metres. The positional accuracy for all spatial inventory base features information must be within 100 metres. The geographic locations of inventory base features may be determined using any appropriate methodology which is capable of producing the target for positional accuracy.

Spatial inventory base feature information must be updated and provided using the NAD83 geodetic datum standard, as described in Section 5.1.1.1. The spatial information must also be compatible with the Arc/Info methodology for maintaining geographic information. Section 5.1.2.5 describes the conditions for providing this digital information.

The MNR or SFL holders (plan holders) must provide the following information, in accordance with the requirements in Section 5.1.2.1, for each of the planimetric base feature coverages.

Water

Water base features currently maintained in the MNR values information system are classified into the three basic polygon types:

Lakes (includes lakes, ponds, and reservoirs)
Rivers (includes rivers and streams)
Wetlands (not evaluated or not classified)

Water polygons describe the general nature of a body of water in terms of water flow and water source. Water polygons (lakes, rivers and wetlands) are comprised of one or more permanent or intermittent water line segments.

Lake polygons include lakes, ponds, and reservoirs. A lake, pond, or reservoir is an inland basin containing water. Lake polygons also include shorelines of the Great Lakes. A reservoir is an artificial or natural basin where water is collected and kept for specific uses.

River polygons include both rivers and streams. A river or a stream is a natural or manmade body of flowing water, emptying into a stream, river, or lake. All permanent rivers or streams that can be defined by an area should be included in the water base feature coverage. As a general rule, rivers are consistently greater than 20 metres in width and streams have an average width less than 20 metres when portrayed at the 1:10,000 operational mapping scale. Rivers are greater than 40 metres and streams are less than 40 metres in width when portrayed at the 1:20,000 operational mapping scale. This standard is consistent with the former OBM program standards for defining water polygons. Smaller rivers, streams, or creeks are defined and maintained as linear features within the centre-line base feature coverages.

Wetland polygons that have not been evaluated or have not been classified using the wetlands evaluation system or a wetlands ecosystem classification are normally included as part of the water coverage. Wetland polygon types maintained in the water base feature coverage consist of lands that are seasonally or permanently covered with shallow water, and should only be included as a water polygon type if the wetland feature is connected by a surface watercourse.

The minimum information required for water features within the inventory base feature coverage is the geographic location and identification, the perimeter and area of the polygon, the official and/or the local name of the water body (as applicable), the polygon type, the date of the data update, and the source of the update.

Water features such as lakes and rivers are classified as a water polygon type within the forest polygon coverage. Wetlands features which are maintained as part of the water base feature coverage are assumed to be open wetlands (not treed wetlands) and are classified as the non-productive forest – open wetland polygon type in the forest polygon coverage.

Values are often associated with specific portions of water bodies or may be attributed to the entire water feature. The requirements for values associated with water planimetric base features are described in Section 4.0.

Wetlands

Polygon features maintained in the wetlands coverage consist of evaluated wetlands, based on the wetlands evaluation system or classified wetlands based on a wetlands ecosystem classification system. Wetland features are classified into the following polygon types: bog, fen, marsh or swamp.

Bog

A bog is a peatland with a water table that is at or near the surface. The surface of a bog is often raised above the surrounding terrain. Bogs are isolated from mineral-rich soil waters and, therefore, obtain their nutrients from atmospheric deposition. Bogs are strongly acidic, extremely nutrient-poor, and lack minerotrophic indicators. The thickness of the peat is usually greater than 40 centimetres. Bogs are usually covered with sphagnum moss species and ericaeceous shrubs, and may be treed or open.

Fen

A fen is a peatland with a water table at or just above the surface. Fens have very slow internal drainage through seepage, but are enriched by nutrients from up-slope mineral water and are therefore more nutrient and oxygen-rich than bogs. The depth of the peat substrate is usually greater than 40 centimetres. Portions of fens may have floating mats. Vegetation consists of sedges, mosses, shrubs, and sometimes a sparse tree layer.

Marsh

A marsh contains standing or slowing-moving water with emergent plant cover on more than 25 percent of the area. Marshes are permanently flooded, intermittently exposed, or seasonally flooded. Nutrient-rich water generally remains within the rooting zone of the plants for most of the growing season. Marshes contain a substrate of mineral soil or well-decomposed sedimentary organic material which is often held together by a root mat.

Swamp

A swamp is a wooded mineral wetland or peatland that has an internal flow of water from its margins or other mineral sources. Swamps contain standing water in pools or channels or gently flowing subsurface water. The water table in a swamp may drop below the rooting zone of vegetation, creating aerated conditions at the surface. A swamp substrate is often woody, well-decomposed peat or a mixture of mineral and organic material. Vegetation consists of deciduous or coniferous trees or shrubs, graminoids (rushes/sedges), herbs, and mosses.

The boundary of a wetland polygon that has a water table at or above the surface should be delineated based on the high water mark for that feature. Within the wetlands base feature coverage, the basic wetland polygon types can be further classified based on the presence of; trees, water plant growth or open water, and key indicator vegetation species associated with basic wetland types. These characteristics and indicators are further described in the wetlands evaluation system and the wetland classification systems.

The MNR will ensure that wetland features are classified into the appropriate wetland polygon types (bog, fen, marsh, swamp) within the wetlands planimetric base feature coverage. SFL holders (plan holders) must utilize updated wetland base features from the wetlands base feature coverage when preparing the forest polygon coverage.

Designated Forest Management Units

The designated forest management unit coverage consists of polygons with the following attributes:

Management Unit Number
Management Unit Name
MNR Administrative District
Date of Verification
Date of Designation
Planimetric Mapping Source
Positional Accuracy

The MNR administrative district identifies the district responsible for monitoring forest management planning for a designated forest management unit. Date of verification identifies the date that the legal metes and bounds description of a forest management unit was digitized within this base feature coverage. Date of designation identifies the date that a forest management unit was established in accordance with Section 7 of the CFSA. The planimetric mapping source identifies the base mapping source (NTS, OBM, FRI) used to establish the boundaries for geo-referenced information. Positional accuracy identifies the approximate spatial accuracy of the boundary information based on the planimetric mapping source.

All the attributes in this planimetric base feature coverage are maintained by the MNR. The accuracy of designated forest management unit boundaries within this digital coverage is normally determined and verified with assistance from SFL holders (plan holders). Any discrepancies in the legal boundaries as defined in the designated forest management unit coverage must be brought to the attention of MNR's Director, Industry Relations Branch and the Director, Forest Management Branch prior to using this information for the purpose of creating an FRI.

Ownership and Land Tenure

The ownership and land tenure base feature coverage is a composite of individual coverages which may be provided separately. This coverage is used in conjunction with the parks and reserves coverage to distinguish responsibilities for producing an FRI, as well as to define the unencumbered Crown land area available for forest management planning.

The ownership and land tenure coverage provides a comprehensive polygon coverage for the entire area of a designated forest management unit (i.e., all area within a designated forest management unit must have an ownership classification). Some areas may have both an ownership and a land tenure classification.

This base feature coverage(s) contains the following ownership polygon types:

Crown
Patent (Crown timber rights)
Patent (fee simple – also referred to as private lands)
Patent (freehold)
Federal Indian Reserve
Other Federal Land

The tenure component of this base feature coverage identifies the various Crown land leases or resource rights associated with Crown land parcels only. The nature of the Crown tenure may cause these areas to be excluded from (unmanaged), or included in (managed), areas eligible for forest management activities in accordance with the FMPM. The following represent examples of Crown land tenure:

Utilization-recreation Zone – Provincial Park
Municipal Forests
Mining Patents
Aggregate Resource Permits
Other forms of land tenure that may affect forest management on Crown lands

Each polygon within the land tenure coverage must have an indicator which identifies whether the polygon is managed or unmanaged Crown land for the purpose of forest management planning, in accordance with the FMPM. Other forms of Crown land tenure, such as mining claims, various land use permits, and licenced and recognized resource uses (tourism areas, recreation, hunt camps, trap lines, and bear management areas), are part of the managed Crown land area, and are also maintained and treated as values for the purpose of forest management planning. Sustainable forest licence holders (plan holders) are required to create and maintain FRI information for areas which fall under Crown ownership and are identified as managed Crown lands. The MNR must ensure that SFL holders (plan holders) are provided with an inventory of forest resources for unmanaged Crown lands within a forest management unit.

Sustainable forest licence holders (plan holders) are not required to create and provide FRI information for other ownerships (patent, federal, native lands), which are referred to as non-Crown lands (non-licenced areas), within a designated forest management unit. The MNR is responsible for ensuring that an inventory of forest resources for non-Crown lands within a forest management unit (except patent lands owned by forest companies), as defined by the ownership and land tenure base feature coverage, is provided to SFL holders (plan holders) for the purpose of forest management planning. The legal source for ownership information, in the case of any discrepancy, is the appropriate regional Land Registry Office.

Parks and Reserves

There are seven types of parks polygons which may occur within the inventory base feature coverage:

National Park
Wilderness Provincial Park
Natural Environment Provincial Park
Waterway Provincial Park
Nature Reserve Provincial Park
Recreation Provincial Park
Historical Provincial Park

There are two reserve polygon types:

Conservation Reserves
Forest Reserves

All of the area identified in this coverage falls under ownership of the Crown, and may be managed federally or provincially. All parks and reserves, with the exception of the recreation-utilization zone of Algonquin Provincial Park, are considered unmanaged lands or excluded lands for the purpose of forest management planning.

National parks, such as Pukaskwa and Georgian Bay Islands, are federally managed areas and are not associated with, or considered as part of, a designated forest management unit. Provincial parks are regulated under the Provincial Parks Act. Provincial parks, such as Shoals or Arrowhead, are incorporated as part of the area of designated forest management units and contribute to the natural features and diversity on those units. The area of Algonquin Provincial Park is designated as a separate forest management unit. Other provincial parks, such as Wabikimi or Lake Superior, are not associated with a designated forest management unit, primarily because of their large sizes. The requirements for stewardship inventory information or planning inventory information, as prescribed by the FIM, may not apply to provincial or national parks.

Conservation reserves are regulated under the Public Lands Act. Forest reserves are not regulated. Forest reserve areas are designated where the protection of natural heritage and special landscapes is a priority.

Parks and reserves on Crown lands are excluded from forest management activities and are referred to as Crown land exclusions from a designated forest management unit area. The exception to this is the recreation-utilization zone of Algonquin Provincial Park where forest management activities are permitted and are subject to the requirements of the FMPM. Consistent with this exception, FRI information must be provided for the recreation-utilization zone of Algonquin Provincial Park in accordance with the FIM.

Parks and conservation reserves are classified as either candidate or regulated, depending on their stage of legal designation and regulation. Both candidate and regulated parks are classified as "Parks" for the purposes of completing Table FMP-1, as described in the FMPM (the recreation-utilization zone within Algonquin Park is the exception). Both candidate and regulated conservation reserves are classified as "Unmanaged" areas for the purposes of completing Table FMP-1. Forest reserves, as defined by a higher land use decision or policy decision (e.g., Ontario's Living Legacy, Land Use Strategy), are also classified as "Unmanaged" areas for forest management planning purposes.

Parks and reserves features and ownership and land tenure features are combined into a composite coverage, which is made up of several individual geographical information layers. This composite coverage identifies the custodian responsible for providing an FRI and also identifies areas which are managed or unmanaged. The custodians responsible for providing an FRI are identified as either the forest industry (SFL holder/plan holder) or the MNR.

Centre-line Base Features

There are four individual centre-line base feature coverages:

Roads
Railways
Utility Lines
Small Rivers, Streams, and Creeks

The centre-line base feature coverages do not form part of the base fabric for the forest polygon coverage. Centre-line features are added after the forest polygon coverage has been created, and when a stewardship or planning inventory information product is required. Each feature is maintained as a line segment or series of line segments and must be maintained in their respective coverages.

Roads

Roads are divided into two categories:

Provincial/Municipal/Township/Private
Crown Forest Access Roads

The MNR will ensure that a digital roads coverage (or coverages), which contains provincial, municipal, township, and private roads, is provided to SFL holders (plan authors) for the purposes of updating the FRI or forest management planning.

Forest access roads include existing roads which are scheduled for maintenance, roads which are no longer maintained by the licence holder, and roads which have been closed or have access restrictions in accordance with an approved forest management plan. Proposed roads, which have not been constructed, are not included in this coverage. The MNR and SFL holders (plan holders) share the requirements to update forest access road information on Crown lands.

SFL holders (plan holders) must provide updates to the roads coverage for active forest access roads on Crown lands within a designated forest management unit. Active forest access roads includes roads which have recently been constructed, which have recently been abandoned (no longer maintained), and where an access restriction has recently been designated. The MNR will ensure that information for abandoned Crown forest access roads, or forest access roads which are no longer actively used for forest management planning purposes, is provided to SFL holders (plan holders).

Crown forest access roads, which are maintained in the roads base feature coverage must be classified as primary, secondary, or tertiary in accordance with an approved forest management plan or past forest management plans.

Railways and Utility Lines

The MNR will ensure that SFL holders (plan holders) are provided with digital coverages containing railways and utility lines features. The utility lines coverage includes linear features, such as gas pipelines, hydro lines, and other transmission and communications lines.

Small Rivers, Streams, and Creeks

This coverage contains small rivers, streams, and creeks that are consistently less than 20 metres in width when portrayed at the 1:10,000 operational mapping scale or less than 40 metres in width at the 1:20,000 operational mapping scale. Small rivers, streams, and creeks are linear features that have not been captured as water polygons within the water base feature coverage.

All linear features, maintained in this base feature coverage, must contain an indicator of water permanency, as either; permanent, seasonally inundated, or intermittent in nature. Permanency describes the portion of the year that the water segment is inundated by water. Water segments are classified as permanent if they contain water for nine or more consecutive months under average annual precipitation conditions. Permanent water segments normally have defined beds, and permanent banks. Water segments are classified as seasonal if the area is flooded during periods of heavy precipitation and/or snowmelt. Generally, seasonally inundated areas are dry under average annual precipitation conditions. Water segments are classified as intermittent if they are dry for more than three consecutive months under average annual precipitation conditions. Generally, intermittent water segments do not have defined beds or permanent banks.

Sustainable forest licence holders (plan holders) must provide the geo-referenced centre-line for a small river, stream, or creek if a new feature or incorrect information about an existing feature is encountered during the implementation of forest management operations. Sustainable forest licence holders (plan holders) are only required to provide information for small rivers, streams, and creeks within the area of forest operations.

5.1.2.3 *Roles and Responsibilities for Inventory Base Feature Information*

The MNR will ensure that SFL holders (plan holders) are provided with the best available (up-to-date) base feature information. In fulfilling this role, the MNR is considered as the custodian responsible for maintaining inventory base feature information with the exception of Crown forest access roads and the forest polygon coverage.

Sustainable forest licence holders (plan holders) must archive, in their records, the digital inventory base feature information provided by the MNR. Sustainable forest licence holders (plan holders) must use copies of the inventory base feature information to meet the requirements prescribed by the FIM and for other forest management planning purposes.

Sustainable forest licence holders (plan holders) are responsible for updating their inventory base feature fabric prior to creating a forest polygon coverage in accordance with the timelines prescribed by this manual. Sustainable forest licence holders (plan holders) are also responsible for combining the appropriate spatial information from the individual planimetric base feature coverages to form the digital base fabric for the forest polygon coverage. If the inventory base features information cannot be spatially combined due to errors, SFL holders (plan holders) must notify the MNR and identify the source of the error or discrepancy.

Sustainable forest licence holders (plan holders) are responsible for verifying the accuracy of inventory base feature information that is provided by the MNR when these features are encountered during the implementation of forest management operations. Verification normally requires that a visual and objective decision be made to determine whether the geographic location and description for an inventory base feature is correct. Sustainable forest licence holders (plan holders) may utilize GPS or similar technology for the purpose of verifying the geographic location.

Where SFL holders (plan holders) encounter new base features or updates to existing base features, licence holders (plan holders) will first update the appropriate planimetric base feature coverages and then apply the new information or updates to the forest polygon coverage. In these cases, the MNR will accept the new or updated information provided by SFL holders (plan authors) for the purposes of preparing and providing FRI information.

The MNR must verify that the inventory base feature information provided by SFL holders (plan holders) is accurate and, if approved, must ensure that information is maintained or updated in the appropriate planimetric base feature coverage in the MNR's values information system. The MNR will archive any updates or changes to digital inventory base feature information that have been provided by SFL holders (plan holders). Verification of inventory base feature information by the MNR may require that MNR staff have access to, or are provided with, source information which was used by an SFL holder (plan holder) to create the changed or updated base feature information.

Sustainable forest licence holders (plan holders) must provide the MNR with source information (aerial photographs, satellite imagery, maps, surveys, inspections etc.) upon request for the purpose of verification. The MNR will use source data and records to verify the quality and accuracy of information provided by SFL holders (plan holders). The MNR will respect the confidentiality and/or intellectual property rights of source information, which is owned or held by SFL holders (plan holders), in accordance with Part A, Section 1.4.2.

The MNR must also ensure that the planimetric base feature coverages which are provided to SFL holders (plan holders) provide coverage for the entire forest management unit. The MNR must also ensure that inventory base features which lie on the forest management unit boundary or that are outside the forest management unit, but that may impact forest management planning, are also provided to SFL holders (plan authors). Sustainable forest licence holders (plan holders) may request, and will be provided with, base feature information if they determine that base features outside their management unit may impact or influence forest management planning.

All inventory base feature information provided by the MNR must be spatially compatible such that slivers or gaps, edge-matching errors and similar geographic information discrepancies between planimetric base features coverages are non-existent. If an SFL holder (plan holder) has notified the MNR that errors or discrepancies with the inventory base feature information exist, such that it cannot be used for creation of an FRI, the MNR will determine the extent of the problem and provide an assessment of the impacts to information requirements prescribed by the FIM. The MNR will also provide the SFL holder (plan holder) with a revised schedule which identifies when the inventory base feature information will be corrected and subsequently provided to SFL holders (plan holders).

The MNR may establish agreements or arrangements with SFL holders (plan holders), other forest resource licence holders, or third parties for the purpose of collecting, verifying, creating, or updating inventory base feature information in accordance with this manual.

5.1.2.4 *Timelines for Providing Inventory Base Feature Information*

Sustainable forest licence holders (plan holders) must provide digital inventory base feature information to the MNR with submission of the stewardship inventory collection or submission of the planning inventory information. Therefore, SFL holders (plan holders) must formally provide any updates or changes to the inventory base feature information at least twice within the term of a forest management plan (terms are currently five years).

However, SFL holders (plan holders) may provide updates to inventory base feature information to the MNR at any time or with the submission of other information products prescribed by this manual, such as:

a) On an annual basis with submission of annual reporting information
b) On a periodic basis with values information, which are associated with inventory base features, and which are encountered during the implementation of forest management operations

The MNR must ensure that the required inventory base feature information is made available to SFL holders (plan holders) at least six months prior to the licence holder's (plan holder's) requirements to provide either stewardship inventory information or planning inventory information. In accordance with this timeline, the MNR will ensure that the best available digital inventory base feature information is provided to SFL holders (plan holders):

a) by October 1 following the end of a forest management plan term for the purposes of preparing a stewardship inventory collection
b) by July 1 prior to the commencement of a new forest management planning process for the purposes of preparing a planning inventory collection and information product

The MNR must also provide SFL holders (plan holders) with digital inventory base feature information as required for the purpose of forest management planning or fulfilling their obligations under the CFSA. Sustainable forest licence holders (plan holders) may request digital inventory base feature information for these purposes at any time. The MNR will normally provide the digital inventory base information for these purposes within 30 days of the SFL holder's (plan holder's) request. If the digital inventory base features information cannot be provided within 30 days of a request, the MNR will notify the SFL holder (plan holder) with a reasonable timeframe for when information can be provided that takes into consideration the SFL holder's (plan holder's) requirements.

5.1.2.5 *Conditions for Providing Inventory Base Feature Information*

Inventory base features information must be provided in digital form by both SFL holders (plan holders) and the MNR in accordance with the requirements and standards described in Section 5.1.2.1 and 5.1.2.2, respectively. The specifications for the provision of inventory base feature coverages, in digital form, required as part of the stewardship and planning inventory collections are described in the *Technical Specifications for Providing Forest Resources Inventory Information*. Both SFL holders (plan holders) and the MNR must provide inventory base features information in accordance with these technical specifications.

5.1.3 Creation of the Forest Polygon Coverage

The forest polygon coverage provides the basic definition of an FRI and requires the most effort and resources to produce of all the components in a stewardship or planning inventory collection. This section describes the requirements, standards, roles and responsibilities, timelines, and conditions for creating and maintaining spatial and tabular information components in the forest polygon coverage. The requirements to provide the forest polygon coverage and the requirements for updating information in the forest polygon coverage, which are specific to the stewardship and planning inventories, are described in Sections 5.2 and 5.3, respectively.

The creation of the forest polygon coverage and its incorporation with other inventory base feature layers requires a three-step process:

Step 1. Update and assemble the inventory base feature information (described in Section 5.1.2)

Step 2. Create the base fabric for the forest polygon coverage using the required inventory base feature information (described in this section)

Step 3. Complete the classification of area in the forest polygon coverage based on forest cover using data collected from forest management activities and natural changes (described in this section)

This three-step process also applies to updating forest polygon information in both the stewardship and planning inventory collections. During updates, some portions of this process may not be required if the information in one or more of the inventory base feature coverages or portions of the forest polygon coverage has not changed.

5.1.3.1 *Requirements for Creating the Forest Polygon Coverage*

The classification of the area on a forest management unit into water and land polygon types is essentially the same for both the stewardship inventory and the planning inventory. The differences in the forest polygon coverage between the stewardship and planning inventories are not related to area classification but are related to:

- the different purposes of a stewardship inventory versus a planning inventory
- the timelines when each forest polygon coverage is required
- the currency of the updated information, based on the purpose and timelines
- actual versus forecasted changes (stewardship versus planning inventory, respectively).

These differences in the forest polygon coverage are further described in Sections 5.2 and 5.3 for the stewardship inventory and planning inventory, respectively.

The initial step in creating a forest polygon coverage requires the update and assembly of inventory base feature information which has been provided by the MNR. Sustainable forest licence holders (plan holders) may update water and wetlands inventory base features information in their respective planimetric base features coverages as described in section 5.1.2 and incorporate the updated information into the forest polygon coverage. Sustainable forest licence holders (plan holders) must combine the following inventory base feature coverages to form a base fabric for the forest polygon coverage:

- Water (lakes, rivers, non-evaluated wetlands)
- Wetlands (evaluated/classified as bog, fen, marsh, swamp)
- Designated Forest Management Unit (legal boundary and map extent for an inventory)
- Ownership and Land Tenure (legal or licensed boundaries of ownership and land-use designation)
- Parks and Reserves

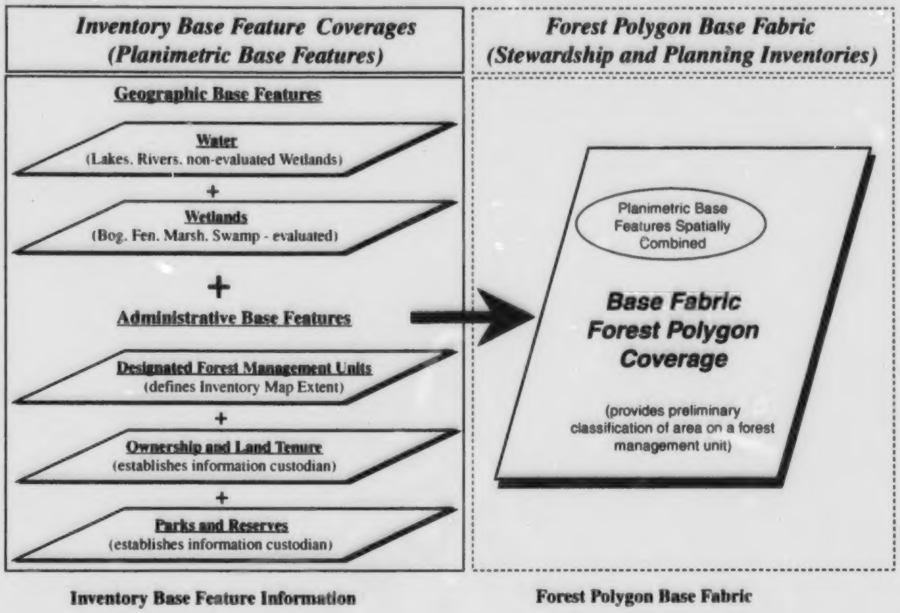
This base fabric contains polygon features only, which provide a preliminary classification of the area within the forest management unit into different water and land types. The polygon features from each inventory base feature coverage should normally be combined in the order given above. Figure B-5 illustrates the assembly of inventory base features and the creation of the base fabric for the forest polygon coverage. Note that linear features, such as roads, railways, utility lines, and small rivers, streams, and creeks are not included in the forest polygon coverage.

For the purposes of creating a base fabric for the forest polygon coverage, the following subset of tabular information must be extracted and derived from the appropriate inventory base features coverages:

Polygon Identification
Polygon Type
Area
Ownership Designation
Year of Update
Source of Data Update

The definitions and descriptions for this information are described in Section 5.1.3.2. This subset of tabular information is referred to as *common description information* that is required for all polygon types (inventory base features and non-forested and forested polygons) within the forest polygon coverage.

Figure B-5 Planimetric base features coverages which form the base fabric for the forest polygon coverage.


Inventory Base Feature Coverages (Planimetric Base Features)
Forest Polygon Base Fabric (Stewardship and Planning Inventories)
Geographic Base Features
Water
(Lakes, Rivers, non-evaluated Wetlands)
+
Wetlands
(Bog, Fen, Marsh, Swamp - evaluated)
+
Administrative Base Features
Designated Forest Management Units
(defines Inventory Map Extent)
+
Ownership and Land Tenure
(establishes information custodian)
+
Parks and Reserves
(establishes information custodian)
Planimetric Base Features Spatially Combined
Base Fabric Forest Polygon Coverage
(provides preliminary classification of area on a forest management unit)
Inventory Base Feature Information
Forest Polygon Base Fabric

Sustainable forest licence holders (plan holders) are required to copy and spatially combine the different inventory base features and must make the appropriate adjustments to spatial and tabular information in the forest polygon coverage as these base features are combined.

Since the MNR provides SFL holders (plan holders) with inventory base feature information in seamless geographic coverages, which span areas that are larger than a forest management unit (i.e., MNR administrative districts), SFL holders (plan holders) must extract the base feature information for their forest management unit area. Sustainable forest licence holders (plan holders) are required to extract and utilize the appropriate inventory base features from these district coverages for areas that fall within, or are close to, the forest management unit boundary. Inventory base features which may be affected by forest management operations conducted by the SFL holder (plan holder), or that may affect how forest management operations are implemented within a designated forest management unit, should be included as part of the base fabric of the forest polygon coverage. Figure B-6 shows the initial stages of creating the base fabric of a forest polygon coverage.

The geographic area illustrated in Figure B-6 shows a designated forest management unit boundary (polygon) that has been overlaid onto water and wetland base features (see inset in the bottom left corner of the forest management unit). The water and wetlands base features have been extracted from their individual planimetric base feature coverages for the respective MNR administrative district.

Figure B-6 Illustration of a map extent for a forest management unit with associated water and wetland base features.

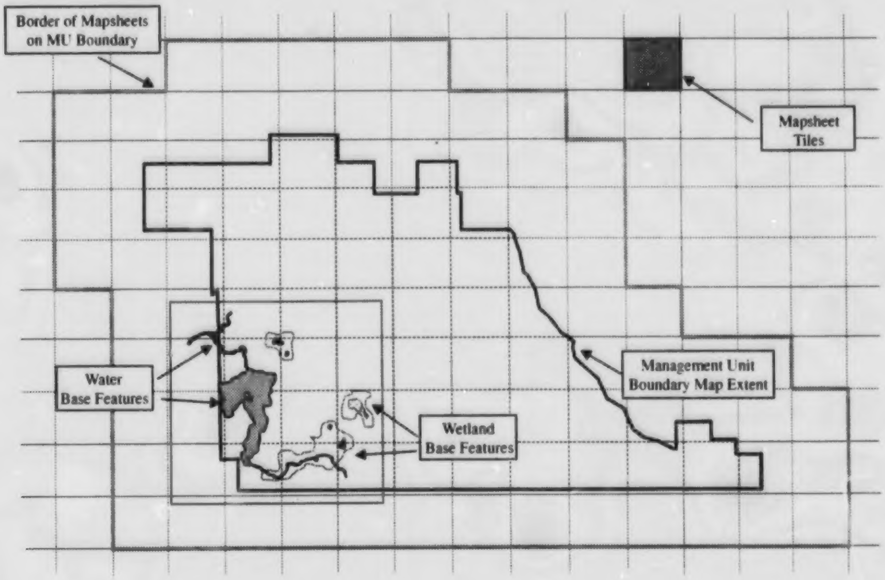

Border of Mapsheets on MU Boundary
Mapsheet Tiles
Water Base Features
Management Unit Boundary Map Extent
Wetland Base Features

Figure B-6 also shows the inclusion of complete mapsheet tiles and corresponding base features (water and wetlands) in the forest polygon coverage that lie on the border of a forest management unit boundary. As a general rule, inventory base features (i.e., water and wetlands) which span more than one complete mapsheet tile beyond the designated forest management unit boundary should be included as part of the base fabric for a forest polygon coverage.

The forest management unit boundary provides the approximate map extent for including inventory base feature information in the forest polygon coverage. The designated forest management boundary also provides the definitive boundary for the purposes of classifying the remaining area in the forest polygon coverage. Forested and non-forested areas which are located outside of the designated forest management unit boundary, with the exception of inventory base features, are not required as part of the forest polygon coverage for that forest management unit.

Inventory base features, such as lakes, rivers, and streams that are maintained in border mapsheet tiles provide geographically referenced, tie-in points needed to spatially join FRIs. Some inventory base features, located within border mapsheets, may also be associated with various values features from neighboring forest management units that may impact or influence forest management activities within the forest management unit for which the forest polygon coverage is being created or updated.

The next step requires that the ownership and land tenure, and the parks and reserves, base features are overlaid onto the water, wetlands, and designated forest management fabric. The ownership and land tenure base feature coverage provides a division of the forest management unit into areas defined by various ownership and land use designations.

Similar to water and wetland base features information, ownership and land tenure polygon features are maintained in separate coverages based on MNR administrative districts. The area in a forest management unit can be separated into two distinct ownership groups:

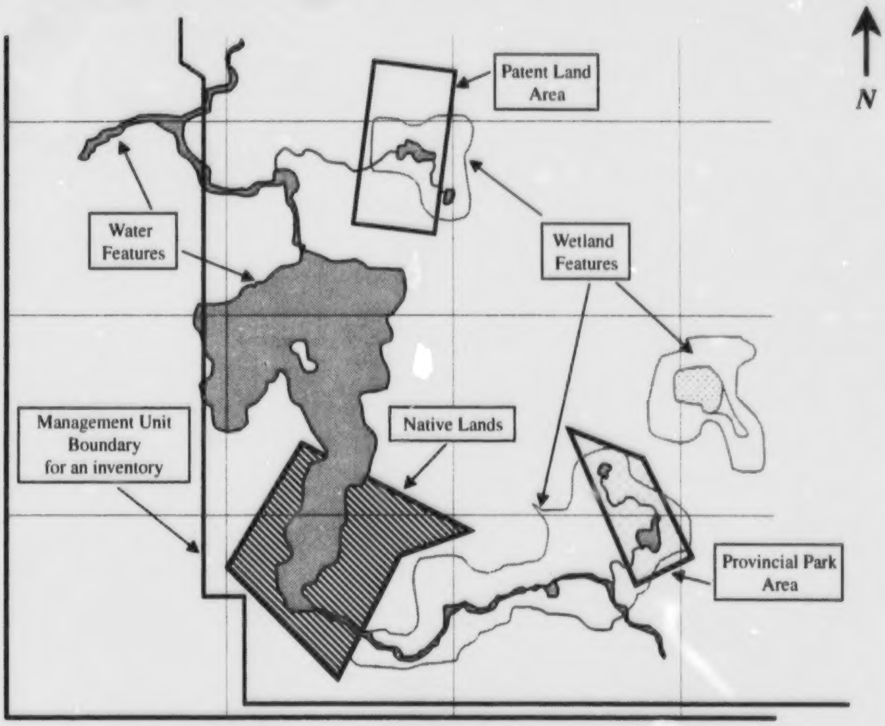
a) Crown ownership (includes managed/licenced Crown lands and Crown land exclusions from a licenced management unit area)
b) Non-Crown ownership which is not included as part of the managed/licenced area of a forest management unit for the purpose for forest management planning

Ownership and land tenure information identifies the Crown land area in a management unit that is considered in forest management planning. The most accurate sources for ownership information are located at the appropriate regional Land Registry Office. Section 5.1.2 provides further definition for the different ownership and land tenure base features. The ownership and land tenure information used in combination with the parks and reserves information identify the licenced Crown areas for which SFL holders (plan holders) are required to produce and provide stewardship or planning inventory information.

The parks and reserves base feature coverage provides a further classification of Crown lands into managed Crown lands and unmanaged Crown lands. Unmanaged Crown lands are also referred to as Crown land exclusions from a licensed area within a designated forest management unit. Land use designations such as provincial parks, conservation reserves, and forest reserves are examples of Crown land exclusions (with the exception of the recreation-utilization zone for Algonquin Provincial Park). Section 5.1.2 provides further definition for the different parks and reserves base features. Figure B-7 shows an example of base features taken from the ownership and land tenure coverage, and the parks and reserves coverage, which have been overlaid onto a portion of a base fabric which contains water and wetlands base features and the designated forest management unit boundary.

The process of combining the spatial features (polygons) from the ownership and land tenure, and the parks and reserves coverages with the water, wetlands, and designated forest management unit features often results in the division or splitting of polygons. The ownership and land tenure, and parks and reserves base features often create administrative divisions of polygons in the forest polygon coverage. As an example, the patent land parcel from the ownership and land tenure coverage

Figure B-7 **Addition of ownership and land tenure features and parks and reserves features to the water, wetlands, and designated forest management unit fabric.**



Base Fabric - Forest Polygon Coverage

shown in Figure B-7 bisects the wetland polygon from the water, wetlands, and designated forest management unit base fabric. In this example, two wetland polygons are created when the patent land boundaries are added to the forest polygon coverage base fabric.

Each new polygon receives a unique polygon identification (normally a geo-referenced number based on the mapsheet tile and UTM coordinate system). The division of polygons becomes more evident as the remaining area on a forest management unit is classified into non-forested and forested polygons, and as updates are made to the forest polygon coverage based on forest management activities and natural changes to forest cover.

Inventory on Non-Crown Areas and Non-licenced Areas

Sustainable forest licence holders (plan holders) are not required to provide updates or changes to FRI information for non-Crown lands and Crown land exclusions from their licenced areas. Areas within a designated management unit that are excluded from forest management activities under an SFL are described in Appendix A of the applicable licence.

The MNR will ensure that an inventory of forest resources is provided to SFL holders (plan holders) for the following lands, based on ownership and land tenure, and parks and reserves, as defined in the base fabric for the forest polygon coverage:

- Patent lands owned by persons or non-forest industry companies
- Patent lands having timber rights reserved to the Crown
- Native lands
- Federal reserves and other federal lands
- Crown land areas designated as parks, conservation reserves, forest reserves or areas designated for non-timber use that are excluded or withdrawn from forest management activities

The MNR will ensure that a digital coverage that describes an inventory of forest resources for these lands is compatible with the forest polygon coverage required for Crown lands. This inventory coverage must also contain sufficient forest cover information to meet the requirements for forest management planning, in accordance with the FMPM. The MNR responsibilities for an inventory of forest resources for non-Crown lands and Crown land exclusions do not apply to patent lands owned by forest companies (also referred to as Patent land – freehold).

Sustainable forest licence holders (plan holders) must combine the inventory of forest resources coverage for non-Crown lands and Crown land exclusions provided by the MNR with the forest polygon coverage for Crown lands for forest management planning purposes.

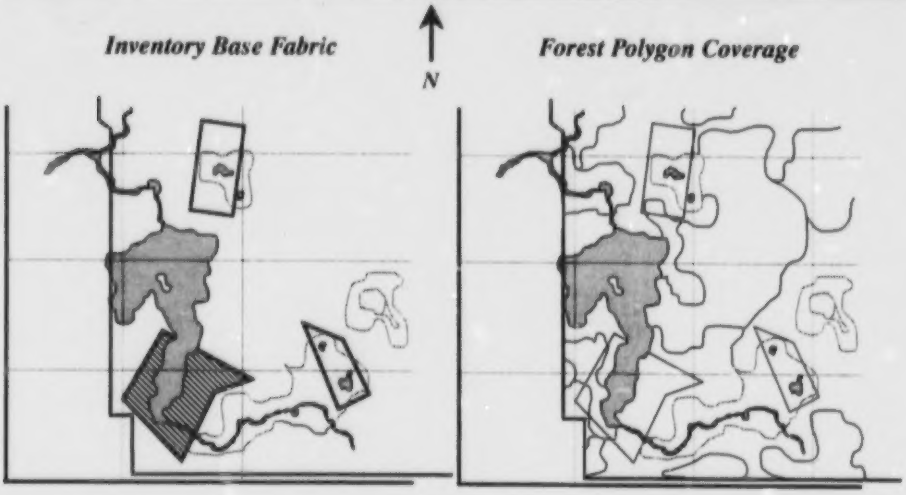
Forest Polygon Coverage (Licenced Crown Lands)

In order to complete the forest polygon coverage, SFL holders (plan holders) must classify the remaining Crown area within the boundaries of a designated forest management unit into non-forested, non-productive forest, and productive forest land types as described by the standards in Section 5.1.3.2. Inventory base features provide many of the non-forested polygon types and some of the non-productive forest polygon types. Sustainable forest licence holders plan holders) must provide the common description information (tabular attributes) for all non-forested, non-productive and productive forest polygons on licenced Crown lands, as described in Section 5.1.3.2.2.

Productive forest areas are then further classified into forest stands which have similar composition, structure, and stage of development. Each productive forest stand polygon within a forest polygon coverage must have an additional set of tabular attributes which are collectively referred to as a forest stand description (see Section 5.1.3.2.3).

Figure B-8 shows the transition from an inventory base feature coverage (base fabric) to a completed forest polygon coverage for a forest management unit. The left side of Figure B-8 shows the base fabric created from the water, wetlands, designated forest management unit, ownership and land tenure, and parks and

Figure B-8 Example showing the transition from an inventory base feature coverage (base fabric) to a forest polygon coverage for a portion of a forest management unit.



reserves base features. The inventory base feature coverage is used as a foundation to classify the remaining land area into non-forested, non-productive forest, and productive forest areas. The right side of Figure B-8 shows the resulting forest polygon coverage.

Forested areas that fall on the border of a forest management unit must use the boundary of the forest management unit (from the designated forest management unit coverage) as part of the polygon boundary. This requirement is also illustrated in Figure B-8. Only inventory base features, such as water and wetlands that are located on the outside of a forest management unit are maintained as part of the forest polygon coverage.

Sustainable forest licence holders (plan holders) are required to provide an updated forest description for all productive forest areas on managed Crown lands within their forest management unit. The spatial information, and tabular information comprised of the common description information and the forest stand description information, as described by the standards in Section 5.1.3.2, are required as part of the forest polygon coverage. Sustainable forest licence holders (plan holders) must provide the forest polygon coverage, in digital form, as part of submission of the stewardship and planning inventory collections, as described in Sections 5.2 and 5.3 respectively.

5.1.3.2 *Standards for the Forest Polygon Coverage*

All polygons in a forest polygon coverage must consist of spatial and tabular information according to the standards described in following sections:

Section 5.1.3.2.1	Standards for Spatial Information
Section 5.1.3.2.2	Standards for Tabular Information – Common Description Information
Section 5.1.3.2.3	Standards for Tabular Information – Forest Stand Description Information

The standards for common description information apply to all polygon types within a forest polygon coverage. The standards for the forest stand description information apply only to productive forest polygons within a forest polygon coverage.

5.1.3.2.1 Standards for Spatial Information

The spatial information refers to the topologic data, which are maintained as arc attributes and polygon attributes. Arc attributes, which describe the vertices, direction, nodes, line segments, and distance, are the basic building blocks of polygons. Polygon attributes define the area, perimeter, and geo-reference identification of each polygon feature.

Spatial polygon information in a forest polygon coverage consists of the geographic location and extent of the polygon, the polygon area, the perimeter of the closed polygon, and a unique polygon identification number. This unique polygon identification number can be a geographic reference point within the polygon called a centroid or a user-assigned value. A polygon centroid represents the centre point of a polygon and forms part of the unique geo-referenced identification for each polygon in the forest polygon coverage. The polygon centroid, or the unique polygon identification number, provides the relational link between the spatial attributes and tabular attributes in the forest polygon coverage. The standards to produce a unique polygon identification number are described in Section 5.1.1.2.

Spatial information is either duplicated from inventory base features, derived as a result of combining inventory base features in a forest polygon coverage, created from the classification of forest management unit area, or created during updates to the forest polygon coverage. The spatial boundaries used to delineate polygons may be determined by interpretation of aerial photography, analysis of satellite imagery, operational mapping, or the physical coordinates of polygon boundaries collected with a GPS during forest operations, surveys, or inspections.

The spatial information component of a forest polygon coverage must be compatible with the ARC/INFO methodology for creating and maintaining topologic data. Sustainable forest licence holders (plan holders) may maintain and manage their topologic information using any methodology or information system, provided that the information they submit to MNR meets the requirements, standards, and conditions prescribed by the FIM. The technical specifications for digital topologic data required in the forest polygon coverage are prescribed by the conditions outlined in Section 5.1.3.5.

The following standards apply to spatial information contained in the forest polygon coverage.

Map Projection and Coordinate System

The geographic coordinates for spatial information in the forest polygon coverage must be updated and provided using the NAD83 geodetic datum standard and UTM map projection system, as described is Section 5.1.1. The spatial information must be compatible with the Arc/Info methodology for maintaining geographic information. Section 5.1.3.5 describes the technical specifications for providing spatial information in a forest polygon coverage.

If SFL holders (plan holders) maintain forest polygon information in other than a mapsheet tile basis (i.e., such as a seamless coverage defined by a forest management unit) they must consult with the MNR to ensure that information satisfies the requirements and standards described in Sections 5.1, 5.2, and 5.3 and that the information is compatible with current FRI information held by the MNR. The technical specifications described in section 5.1.3.5 may describe further technical direction for providing FRI information in seamless coverages.

Positional Accuracy of Polygon Boundaries

The positional accuracy for all polygon boundaries within a forest polygon coverage should normally be to within 10 metres, and must always be within 100 metres. The positional accuracy of a feature or boundary should be assessed based on using the same or similar method which was used to determine its geographic location.

Area of Polygons

The actual area and perimeter of each polygon within the forest polygon coverage are stored as part of the spatial attributes. The spatial polygon area attribute represents area in square metres and is normally stored as a single or double precision value. The spatial polygon area attribute provides the definitive source for polygon area information and should be used in all calculations or representations of area. The spatial area attribute is also used to automatically calculate the tabular polygon area attribute, in hectares, to the nearest 1/10 (0.1) of a hectare.

Minimum Polygon Size Targets

The minimum polygon sizes in a forest polygon coverage are expressed as targets which are based on the scale of mapsheet tiles. As targets, they provide a source of guidance and should not be treated as a rigid standard. In Ontario, the areas which have been designated into forest management units are represented by two mapsheet tile scales: 1:20,000 and 1:10,000. The following minimum polygon size targets normally apply to forest polygon coverages which are formed from 1:20,000 scale mapsheet tiles:

- For productive forest stands delineated from photo-interpretation the minimum polygon size is eight hectares
- For polygons which are created from forest management activities (depletions, renewal) or natural change, the minimum polygon size is two hectares
- For non-productive forest polygons the minimum polygon size is one hectare

The minimum polygon size targets for forest polygon coverages, which are based on 1:10,000 mapsheet tiles, are determined by dividing the targets for 1:20,000 scale mapsheet tiles in half. For example, the minimum polygon size target for photo-interpreted polygons based on a 1:10,000 scale mapsheet tile is four hectares. Polygons, which are smaller than the minimum size targets, with respect to the scale of a mapsheet tile, should normally be absorbed into an adjoining polygon. The joining of polygon areas should result in no net loss in area. The tabular attributes (common description or forest stand description information) of the new, larger polygon should also be adjusted, where appropriate, to reflect any changes.

Coincident Arcs – Slivers

As inventory base features are combined and as the remaining area within a management unit is classified into the different polygon types, coincident arcs (shared boundaries between adjacent polygons) often occur (e.g., productive forest polygons which follow a water polygon base feature). In these cases, polygon boundaries of inventory base features must be adopted over boundaries created from classifying the remaining area. The priority for coincident boundaries between inventory base features is determined by the order in which the inventory base features were added to the forest polygon coverage, as described in Section 5.1.2.

If the boundary of an inventory base feature that shares the same boundary as a productive forest polygon is incorrect (wrong placement), SFL holders (plan holders) must also update the affected base feature in its respective planimetric base feature coverage. The updated data for the affected planimetric base feature coverage must be submitted with the updated forest polygon coverage at the appropriate time for either the stewardship or planning inventory collections.

Situations that involve coincident arcs must be resolved such that polygon slivers (gaps or overlaps created when adjacent polygon features are spatially combined) are not created in the forest polygon coverage. Slivers of any size are not acceptable.

Edge-Matching

Polygon features that cross mapsheet tile boundaries must be free of edge-matching errors. Mapsheet tile boundaries are often used to form portions of polygon boundaries. The forest stand description attributes, for a productive forest stand which is bisected by a mapsheet tile boundary, should be the same for both portions of the forest stand. All polygon boundaries should form contiguous lines within the area of a forest management unit.

Other Standards for Spatial Information

Other standards pertaining to spatial information required in the forest polygon coverage are described in the technical specifications identified in Section 5.1.3.5.

5.1.3.2.2 Standards for Tabular Information – Common Description Information

All polygons in a forest polygon coverage require the following common description information:

Polygon Identification
Polygon Type
Area
Ownership Designation
Year of Update
Source of Data Update

The data required for these attributes must be created or updated for all polygon types (water, non-forested, non-productive forest, and productive forest polygons) in the forest polygon coverage. Similar to spatial attributes, these tabular attributes are either duplicated from inventory base features, derived as a result of combining inventory base features in a forest polygon coverage, created from the classification of area on the forest management unit, or created during updates to the forest polygon coverage. The common description information must be completed for all ownership, land tenure, and land use designations.

Polygon Identification

The polygon identification is composed of three tabular attributes:

Forest Management Unit Number
Mapsheet Number
Polygon Number

These three attributes provide a unique identification for any forest polygon within the areas of Ontario that have been designated as forest management units. Polygon identification currently incorporates mapsheet tiles and the UTM coordinate system as a basis for uniquely numbering and geo-referencing polygons in the forest polygon coverage. However, one or more of these tabular attributes that make up the current methodology for polygon identification may change with advancements in the management of spatial data within seamless geographic coverages.

Sustainable forest licence holders (plan holders) may provide polygon identification information in a forest polygon coverage which is not geo-referenced or that is based on a seamless coverage design, as described in Sections 5.1.1.2, 5.1.1.3 and

5.1.3.2.1. The technical specifications described in Section 5.1.3.5 may provide further technical direction regarding polygon identification standards in these cases.

Forest Management Unit Number

The forest management unit number corresponds to a three-digit number assigned to each designated forest management unit, which has been established in accordance with Section 7 of the CFSA. Each forest management unit number also has a corresponding management unit name, which together, provide a unique identifier for each designated forest management unit in Ontario. The forest management unit number is extracted from the designated forest management unit coverage which is maintained in the MNR's values information system.

Mapsheet Number

The mapsheet number identifies the UTM longitudinal zone, the mapsheet tile scale (1:10,000 or 1:20,000) and the planar coordinates for the geographic location of a specific mapsheet tile (grid square) located within each UTM zone. The planar coordinates identify the location of the southwest corner of the mapsheet tile based on easting and northing distances. The requirements for the mapsheet number are described in Section 5.1.1. The mapsheet tile number within each UTM zone also forms part of the geographical reference for each polygon feature in a forest polygon coverage.

Polygon Number

The standard for a polygon number requires that a unique identification is determined for every polygon within a mapsheet tile (see discussion on Polygon Identification in regards to seamless coverages). A polygon number may be geo-referenced or sequentially assigned in an organized manner within a mapsheet tile.

Many forest resource inventories contain polygon numbers that are based on the geo-referenced location of a point within each polygon (often called the centroid). The coordinates of this point are based on a grid system that partitions a mapsheet tile into uniform units of distance depending on the forest management unit and the respective mapsheet tile size for that area. Geo-referenced polygon numbers are expressed in eastings and northings and should be generated in a consistent manner using the ARC/INFO methodology for maintaining topologic data. Polygon numbers must not be greater than the number 9999.

Some SFL holders (plan holders) have adopted a sequentially-based numbering system for uniquely identifying polygons within a mapsheet tile. A polygon number, which is assigned in a sequential manner normally does not correspond to a geo-referenced location within a mapsheet tile. However, sequentially-assigned polygon numbers are acceptable, provided that the polygon numbers are unique with each mapsheet tile.

With either of these methodologies, it is possible to have the same polygon number for two different polygons that occur in different mapsheet tiles. Therefore, it is important that the complete polygon identification, comprised of forest management unit number, mapsheet number, and polygon number, is maintained together. The polygon identification provides the critical link between spatial and tabular attribute information for all polygons in the forest polygon coverage.

The polygon number is also referred to as a forest stand number (or simply stand number). If the geo-referenced methodology is used to uniquely identify polygons, polygon number may also be referred to as the geo-reference number (geo-ref num).

Suffixes to polygon numbers (polygon suffixes), which have been used in previous FRIs, must not be used for the purpose of creating a forest polygon coverage. Each new polygon, which is created from the bisection of existing ones due to forest management activities or natural changes, must be assigned a unique polygon identification. Forest resource inventories, which apply the geo-referenced methodology for polygon numbering, will result in entirely different geo-referenced polygon numbers for each new polygon. Forest resources inventories which apply the sequential polygon number methodology may create either new polygon numbers for each polygon or reuse existing polygon numbers when the forest stand description attributes for a portion of the polygon have not changed.

Polygon Type

The polygon type is determined from the classification of area on a forest management unit into different water and land types (see Figure B-9). Some polygon types are derived from inventory base features, while other polygons must be created from a classification process.

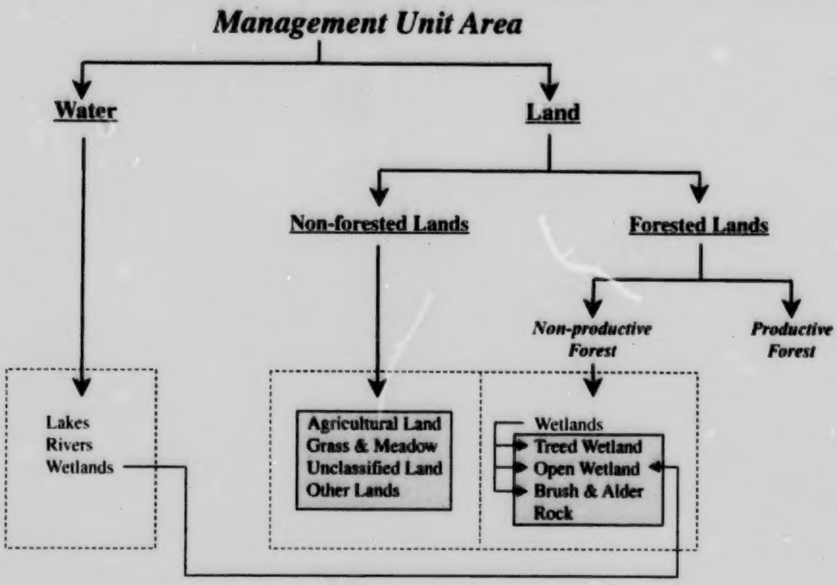
All water polygon types in a forest polygon coverage are extracted from the water planimetric base feature coverage. Wetland features, which are maintained in the water planimetric base feature coverage, form the non-productive forest – open wetland polygon types in the forest polygon coverage. Some of the non-productive forest, wetland polygon types are also extracted from the wetlands base feature coverage. The polygon types that are not shaded in Figure B-9 are derived from inventory base feature information.

All remaining land areas within a designated forest management unit are classified into various non-forested or forested lands in accordance with Figure B-9. The polygon types shown in the shaded areas, including productive forest areas, are classified by photo-interpretation, analysis of satellite imagery, or field surveys and inspections.

Appendix III contains the Polygon Type Validation Look-up Table. Only one of the data values from this table may be entered into the polygon type attribute for each polygon.

In older FRIs, some areas were classified as an "unsurveyed" land type. These were defined as areas within a designated forest management unit which had not been surveyed and for which no information was available to identify a specific land type. Unsurveyed areas on Crown land FRIs are virtually non-existent and, therefore, are

Figure B-9 Classification of a management unit area into polygon types for the purpose of creating or maintaining the forest polygon coverage.


Management Unit Area
Water
Land
Non-forested Lands
Forested Lands
Non-productive Forest
Productive Forest
Lakes
Rivers
Wetlands
Agricultural Land
Grass & Meadow
Unclassified Land
Other Lands
Wetlands
Treed Wetland
Open Wetland
Brush & Alder
Rock

no longer acceptable in a forest polygon coverage. All remaining unsurveyed areas must be correctly classified prior to providing a stewardship or planning inventory collection in accordance with the timelines in the FIM.

Non-forested lands

Non-forested lands are defined as areas that have little or no forest or shrub cover and have been designated for some other purpose than forest management. Non-forested lands are not included as part of the timber production land base in a forest management plan. The polygon types for non-forested lands are: Developed Agricultural, Grass & Meadows, Unclassified, and Other.

Developed Agricultural Lands (DAL): These are developed agricultural lands which are cultivated for growing crops, orchards, floral gardens, etc. These areas may also include abandoned agricultural lands.

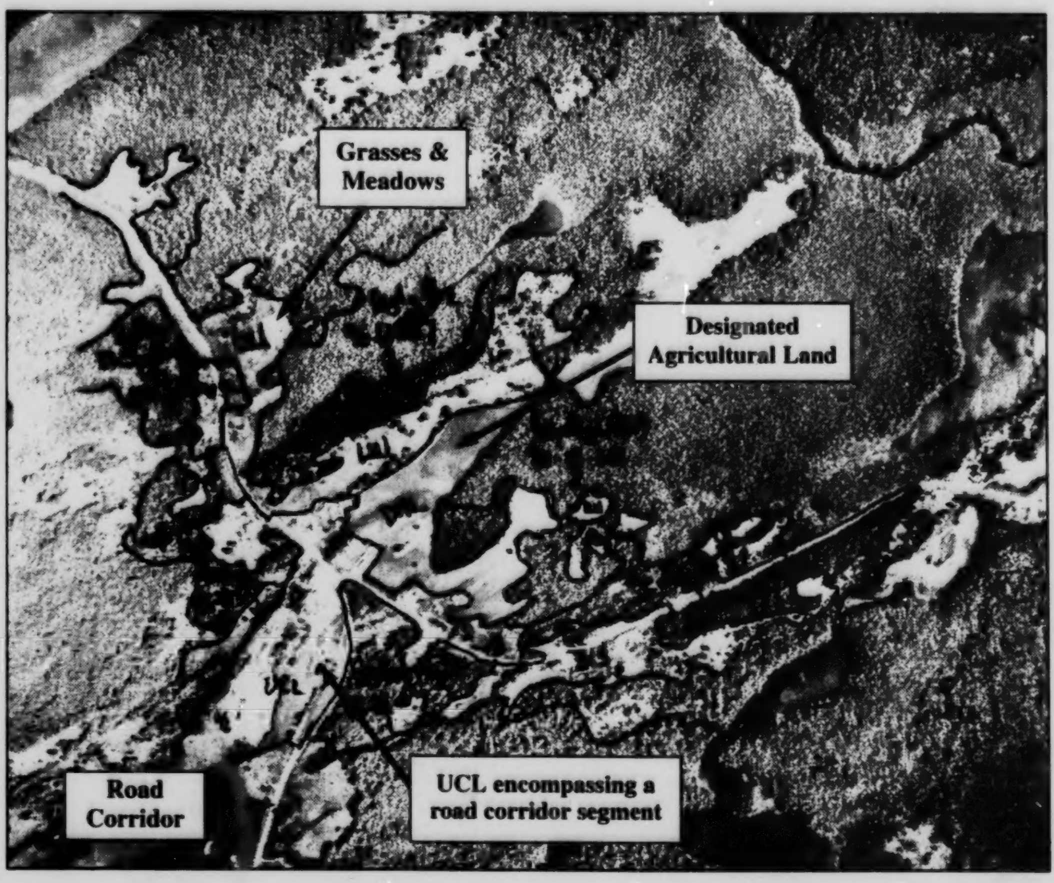
Grass & Meadows: Grass and meadows are farm areas devoted to pasture for domesticated animals. These areas may also include abandoned grass and meadows but are not part of the productive forest land base and do not include barren and scattered areas.

Unclassified Lands (UCL): Unclassified land types consist of non-forested areas which were created for specific uses other than timber production such as roads, pipelines, mines, logging camps, gravel pits, airports, transmission line corridors, etc. Most UCL lands have been cleared of trees.

Many UCL types incorporate linear planimetric base features and adjacent non-forested areas as part of the UCL polygon area. Examples are small exposed rock outcrops (less than one hectare), road push-outs, small gravel extraction areas, cleared construction sites, storage sites or building structures that are adjacent to roads, railways, hydro lines, gas pipelines, communications lines, etc. Figure B-10 shows an example of how UCL polygons are delineated during photo-interpretation. Note that some of the UCL types include a portion of an existing road corridor segment.

Transportation and utility corridors are common linear base features which are used during photo-interpretation to separate forest stand polygons that have different forest stand descriptions on either side of the corridor (road). The area occupied by the linear base feature is assumed by one of the forest polygons. When a stewardship or planning inventory information product is created, the actual area, or a close approximation of the actual area, associated with the linear features (e.g., area of a road corridor) is removed from the original UCL polygon. This is

Figure B-10 Conventional aerial photograph showing delineation of non-forested polygons.


Grasses & Meadows
Designated Agricultural Land
UCL
Road Corridor
UCL encompassing a road corridor segment

normally achieved by buffering the centre-line of a linear feature from the applicable centre-line base feature coverages and then removing the area (as calculated from buffering) occupied by the corridor from the original UCL polygon. The process of buffering linear features and how buffered linear features are added to the forest coverage for the purpose of creating a stewardship or planning inventory information product is described in Sections 5.2 and 5.3, respectively.

Some SFL holders (plan holders) may delineate the actual area associated with a road corridor or other linear feature as a separate UCL polygon, thereby eliminating the need to buffer centre-line features as described above. In some cases, these UCL polygons may also include adjacent area features which are associated with the road corridor (e.g., road push-outs or gravel pits) as separate UCL polygons. If this approach is used, the centre-lines for these linear features must also be maintained in the appropriate linear base feature coverages (roads, railways, utility lines, small rivers and streams).

Either approach to delineating UCL areas within the forest polygon coverage is acceptable, provided that each approach is consistently applied throughout the coverage.

Other Lands: These are lands that are non-forested lands and do not fall into the other non-forested land types. If a non-forested polygon type is identified as other lands, then a description of other land must be identified.

Forested Lands

Forested lands are areas which are covered partially or totally by trees and/or shrubs. There are two types of forested lands: non-productive forest and productive forest.

Non-Productive Forest

Non-productive forest areas may support minimal tree growth or may be covered by shrubs or other vegetation. These areas may have few or no trees, support relatively poor tree growth, and are not suitable for commercial timber production or conventional forest management. Some non-productive forest areas may be reclaimed or reclassified as productive forest given the appropriate silvicultural treatment.

Wetland base features taken from the wetland base feature coverage must be assigned to one of the wetland non-productive forest types when applied to the forest polygon coverage. If a wetlands planimetric base feature coverage does not exist for the forest management unit then the appropriate wetland polygon types must be created during the classification of the remaining area on a forest management unit.

Wetland areas must be assigned to one of the following non-productive forest types:

> *Treed Wetlands:* Treed wetlands (or treed muskeg) are dry or wet areas of wetlands (muskeg) on which stunted trees occur as widely scattered individuals or in small groups.
>
> *Open Wetlands:* Open wetlands (or open muskeg) include wet areas of mosses, grasses, sedges, and small herbaceous plants, often interspersed with small areas of open water. Wetland areas around lakes and rivers should be delineated separately from the associated water polygons.
>
> *Brush & Alder:* These land types are covered by non-commercial tree species or shrubs, such as alder and other brush or bush species. These areas are normally associated with wetlands or water features and must not be confused with productive forest areas of similar brush or bush cover which have developed as a result of forest management operations (e.g., areas that have recently been depleted, or are below silvicultural standards, such as former barren and scattered areas).
>
> *Rock:* Any area of barren or exposed rock (e.g., bedrock, rock outcrops, cliff faces, talus slopes, or rock rubble slopes) which may support a few trees, may have patches of shallow soils, and has a stocking of trees less than 0.25 (25 percent).

If the wetlands ecosite type is known, the actual ecosite should be identified in the ecosite tabular attribute (see Section 5.1.3.2.4). Non-productive forest polygons do not require a forest stand description.

Productive Forest

Productive forest areas support tree growth and are designated as either production forest areas or protection forest areas. The classification of productive forest areas into production forest or protection forest is based on decisions made in forest management planning. The different productive forest areas are identified and described by the productive forest modifier attribute.

> *Production forest areas* are capable of producing trees and can support tree growth and the harvesting of timber on a sustained yield basis. Some production forest areas have physical and biological characteristics, such as terrain, soil, or poor tree growth, and are referred to as management considerations. Other production forest areas may have adequate growth for timber production, but have been designated as management reserves or buffers in AOC planning.
>
> *Protection forest* areas are capable of producing trees, but cannot support timber harvesting on a sustained yield basis. Protection forest areas have biological or physical characteristics (management considerations) such that conventional forest operations may significantly harm or damage sensitive forest sites or ecosystems.

All productive forest areas must be classified into smaller components called forest stands. Forest stands are composed of tree species that have similar composition, structure, growth, site, and stocking characteristics and, therefore, have similar forest stand descriptions. All productive forest stands must have a forest stand description. The standards for forest stand description tabular information are described in Section 5.1.3.2.3.

Polygon Area (Spatial to Tabular)

The polygon area is the total area within a closed polygon boundary. As described in the spatial standards (Section 5.1.3.2.1), the true area of a polygon is maintained as a spatial attribute and is used for all area representations. The value for area maintained in the spatial attributes is represented to the nearest square metre and is used to calculate the area in hectares, which is maintained in the tabular attribute file.

Area is most commonly referenced and communicated in hectares, thus the need to have a standard for rounding actual area maintained in square metres, as a spatial attribute, to area in hectares. As a general rule, all calculations involving area should be based on the actual spatial area in metres, before it is rounded to the nearest 1/10 (0.1) of a hectare. Area is also normally represented in hectares when used in forest modelling, forest management planning, and reporting. The tabular polygon area (in hectares) must be rounded to the nearest 1/10 (0.1) of hectare in the forest polygon coverage.

Sustainable forest licence holders (plan holders) are not required to provide the tabular polygon area. However, the MNR will calculate the tabular polygon area based on the corresponding spatial area. Sustainable forest licence holders (plan holders) may provide the tabular polygon area which has been calculated from the actual spatial area according to this standard.

Ownership Designation

The ownership designation attribute is derived from the ownership and land tenure, and parks and reserves base feature coverages which are maintained in the MNR's values information system. The combination of ownership, land tenure, and land use information identifies the custodian responsible for providing FRI information in accordance with this manual. This attribute also identifies the managed Crown area in a forest management unit. A further description of this information is provided in Section 5.1.3.

Any discrepancies regarding the information contained in the ownership designation attribute should be reported to the appropriate MNR district office. The most accurate source for ownership information is located in the appropriate regional Land Registry Office. Appendix III contains the Ownership Designation Validation Look-up Table. Only one of the values in this table may be entered into this data field.

Year of Update

The year of update identifies the most recent calendar year that information about a polygon was last modified or changed based on field inspection, photo interpretation, analysis of satellite imagery, or conversion or update to spatial or tabular data contained in the forest polygon coverage. The year of update must consist of a four-digit number.

For productive forest stands, the year of update should normally reflect a change in any of the forest stand characteristics or the stage of development attribute. The year of update should not reflect error corrections to tabular attributes. The year of update is a key attribute in determining the vintage of productive forest stand information as described in Section 5.1.3.3.1, and in determining the requirement for re-inventory as described in Section 5.1.3.3.2.

In some cases, only the year of update may be changed if verification through field inspection of the forest stand characteristics and the stage of development resulted in no changes to these attributes. If understory, basal area distribution, or ecosite information is updated, the forest stand characteristics and stage of development information should be verified and/or updated as required at the same time, such that all information is brought to the same year of update. The year of update may also reflect a change to the common description information for water, non-forested, and non-productive forest polygon types in a forest polygon coverage.

Source of Data Update

The source of data update attribute identifies the type of information based on the data collection method, survey type, update procedure, or planimetric base feature coverage source that was used to create the latest change or update to a polygon. Appendix III contains the Source of Data Update Validation Look-up Table. The source of data update may include planimetric base features coverages, photo-interpretation, field inspections, or various samples and surveys. Only one of the values from this table may be entered into this data field. The source of data update attribute does not apply to the changes or updates made to the ecosite attribute.

Any changes to productive forest polygons in the forest polygon coverage which have been simulated, forecasted, or projected from growth prediction or succession models must first be approved by the appropriate MNR Regional Director responsible for approving the applicable forest management plan.

5.1.3.2.3 Standards for Tabular Information – Forest Stand Description Information

This section describes the standards for forest stand description information which is required for all managed Crown productive forest areas within a designated forest management unit. Sustainable forest licence holders (plan holders) must prepare updated forest stand descriptions for all productive forest areas on Crown lands under licence in accordance with the standards described in this section. Forest stand description information maintained in the forest polygon coverage must be updated at specific timeframes in both the stewardship inventory and planning inventory collections as described in Section 5.2.1 and Section 5.3.1, respectively.

One of the most critical sources of information which is needed to support the update and maintenance of several of the forest stand description attributes, are the results of silvicultural effectiveness monitoring (SEM) surveys. *The Silvicultural Effectiveness Monitoring Mannual for Ontario* (SEMMO) describes the acceptable methodologies to conduct surveys, the data to be collected, and the process, analysis, and considerations in determining and reporting on the effectiveness of forest management operations based on the analysis of survey data. Part D describes the requirements to conduct SEM surveys in accordance with the SEMMO and the requirements to utilize SEM survey results/data for the purpose of updating FRI information. Sustainable forest licence holders (plan holders) must utilize the results of SEM surveys when maintaining and updating the forest stand description information.

Several other sources of information must be used to maintain and update forest stand description information. Sustainable forest licence holders (plan holders) must maintain, as part their information records any source information (surveys, samples, tests, studies, inspections etc.) that are used to maintain and update forest stand description information.

Productive forest polygons are determined based on the homogeneity of tree species in a forest canopy in combination with distinguishable geographic and physical features of the landbase. Productive forest areas are also referred to as forest stand polygons. Productive forest stands may also be determined based on ecosite information derived from aerial photo-interpretation in conjunction with soils, vegetation, and drainage information using a forest ecosystem classification system for the respective eco-region.

All productive forest areas on licenced Crown areas within a designated forest management unit must have a complete forest stand description. Table B-1 provides a list of the mandatory attributes required in a forest stand description.

The attributes listed in italics in Table B-1 have validation look-up tables. These look-up tables provide a range of acceptable options and inputs for a specific attribute. Only information contained in a validation look-up table may be used as data for the applicable forest stand description attribute. A listing of the validation look-up tables and corresponding pick-list definitions are provided in Appendix III.

Changes From Traditional Forest Resources Inventory Information

Some of the forest stand description attributes defined by these standards have been modified from the traditional FRI attributes to provide information that is more applicable to current forest modelling and forest management planning needs. Most of the modifications to the forest stand description information apply to the stand type attribute in a traditional FRI. The process to convert the traditional FRI attributes to the forest polygon coverage attributes is also described in these standards. Sustainable forest licence holders (plan holders) are required to convert the traditional FRI attributes to common description and forest stand description attributes needed in the forest polygon coverage, as described in this section.

Table B-1 Forest Stand Description Attributes
Forest Polygon Coverage – Productive Forest Polygons Managed Crown Areas

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Vintage and Source Information

- * Year of Origin
- * Year of Last Depletion

Physical Forest Stand Attributes

- * *Productive Forest Modifier*
- * *Stage of Development*
- * *Management Consideration*
- * *Accessibility Indicator*

Forest Stand Characteristics

- * *Species Composition*
- * Stocking
- * *Height*
- * *Site Class*
- * *Working Group*
- * Age Structure Indicator
- * Ecosite
- * *Ecosite Source of Data Update*
- ** *Basal Area Distribution*
- *** *Understory Species Composition*
- *** Understory Year of Origin
- *** Understory Stocking
- *** *Understory Height*
- *** *Understory Site Class*
- *** *Understory Working Group*

Notes:

* These attributes apply to all productive forest stands on managed Crown lands

** These attributes are required for productive forest stands that are uneven aged (all-aged), or having no distinguishable canopy layers and are normally managed under the selection silviculture system. These attributes can also be applied to stands which have multiple stories of forest canopy and are managed under the shelterwood silviculture system.

*** These attributes apply to productive forest stands that are even-aged and have more than one distinguishable forest canopy. These attributes apply to productive forest stands which are managed under a shelterwood silvicultural system or managed under certain modified clear-cut silvicultural systems such as a strip, block, seed tree, CLAAG, HARO, HARP treatments (see stage of development attribute).

Some additional attributes are also required for certain forest stands which are managed under a shelterwood or selection silvicultural system. These additional attributes must be collected over a transitional period that allows SFL holders (plan holders) to collect and provide the additional information as forest stands are encountered in forest management planning. The standards for transitional attributes are also described in Section 5.1.3.2.

Some of the forest stand description attributes listed in Table B-1 have been modified from, or are an enhancement to, the traditional STANF attributes (STANF refers to the standard set and format of tabular attributes that have been traditionally produced as part of a spatial FRI by the MNR). These changes more closely align the FRI information with current forest management planning requirements. The forest stand description attributes defined by the standards in Section 5.1.3.2 have less ambiguity and stronger definitions than the STANF information, such that FRI information can be described in more detail and can be compared more readily across the province. The following forest stand description attributes are considered as enhanced, based on their difference from traditional STANF attributes:

Year of Last Depletion
Productive Forest Modifier
Stage of Development
Management Consideration
Accessibility Indicator
Age Structure Indicator
Ecosite
Ecosite Source of Data Update
Basal Area Distribution
Understory Species Composition
Understory Year of Origin
Understory Stocking
Understory Height
Understory Site Class
Understory Working Group

In order to apply many of these enhanced attributes, a process to convert from the former STANF information to specific enhanced forest description attributes is required. In some cases, more descriptive information has been added to other enhanced forest description attributes which will require a transitional period for collection and verification of the information. The standards for conversion and transition from the former STANF information attributes to the enhanced forest description attributes required in a forest polygon coverage are described in Section 5.1.3.2.6.

5.1.3.2.4 Forest Stand Description Attribute Definitions

The following forest stand description attributes and corresponding definitions apply to the productive forest stands in a forest polygon coverage. The standards for updating each forest stand description attribute are also described.

Vintage and Source Information

Year of Last Depletion

The year of last depletion represents the latest fiscal year that a productive forest stand area was depleted or partially depleted by harvest or by natural causes, or that received a mid-rotation treatment or stand improvement operation where merchantable timber was removed. The FMPM defines the depleted area as managed forest area on which merchantable volume has been decreased due to harvest, fire, insect, disease, or other causes and where forest renewal is required.

The forest polygon coverage must be updated with all depletions (harvest and natural) which are identified in annual reports. The year of last depletion for each productive forest stand must correspond to the year that the depletion occurred, as recorded in the applicable annual reports.

Forest stands that are managed under the selection or shelterwood silvicultural systems must also have a year of last depletion. The year of last depletion provides an estimate of the stage of forest stand development within a cutting cycle for selection stands or within the current stage of a shelterwood system.

In the case of a partial harvest where certain tree species have been removed, such as a first pass where merchantable trees remain in a forest stand, the year that the first pass was carried out must be entered as the year of last depletion. If an additional harvest or pass is conducted, the year of last depletion is changed to the year in which the most recent harvest/pass operation was carried out.

Commercial thinning and spacing operations are mid-rotation treatments that are recorded as depletions and are considered depleted areas in forest management planning. Forest stands that have received a commercial thinning or tending treatment must show the applicable year of last depletion in the forest polygon coverage.

The year of last depletion is also used to identify other mid-rotation tending operations, such as pre-commercial thinning, spacing, or stand improvement. A pre-commercial thinning is normally associated with the clear-cut silvicultural system and a stand improvement operation is normally associated with the selection system. These treatments are not usually considered as depleted areas. However, the fiscal year in which these types of operations occur provides an indication of the stage of development, based on the length of time from the last operation and how forest stands are likely to respond.

Year of last depletion must not be used to indicate other tending operations, such as a chemical or manual release which are required to bring a forest stand to free-to-grow standards.

The year of last depletion must consist of a four-digit number that represents the fiscal year that the depletion or mid-rotation treatment took place. As an example, the 2002/2003 fiscal year is recorded as 2002 in the year of last depletion attribute.

Year of Origin

The year of origin is used to calculate the average age of a productive forest stand. The year of origin is determined in relation to the age of the trees and the year that regeneration (natural or artificial) was established on a site. The year of origin is synonymous to the year of germination. If regeneration has not been established, then the year of origin will be the same as the year of last depletion. Once trees are established on the site, the year of origin must be adjusted to reflect the average age of the established regeneration. In free-growing forest stands, the year of origin can be determined by subtracting the average age of the trees (normally the dominant or working group tree species) in a productive forest stand from the current year. The year of origin must consist of a four-digit number.

As an example, if a productive forest stand was harvested in the fiscal year 2000 and then planted (renewed) in the fiscal year 2002 with three-year-old nursery stock, the year of origin for that stand would be recorded as 1999. All productive forest stands must have a year of origin. The actual age in years must not be entered as the year of origin.

Once a forest stand has been assessed as free-to-grow, based on attaining the regeneration/management standards for the respective forest unit and site type combination, the year of origin should be adjusted to reflect the average age of the growing stock on that site. The year of origin for a stand that has been declared free-to-grow must be determined using the age information collected from an SEM survey. The year of origin must be determined from an SEM survey, whether or not a forest stand has met regeneration or management standards.

In determining the year of origin, age differences that result from natural and artificial growing stock, or age differences that occur due to modified clear-cut harvesting or shelterwood management, must be considered.

For example, if a productive forest stand is harvested in two strips/passes which occur in different years (e.g., a type of modified clear-cut), the forest stand will technically have two ages for a period of time; one age for the recently depleted strip and another age for the non-depleted strip. The eventual strategy is to produce an even-aged forest stand. Therefore, the year of origin will eventually be determined as one average value for the forest stand. If the remaining strip is not harvested for ten years (assuming that the harvested strip requires the same time period to reach free-growing conditions), the harvested and regenerated strip will be described by the understory forest stand characteristics and, therefore, have a separate year of origin. The year of origin and the forest stand characteristics for the overstory will likely not change. Once the remaining strip has been harvested and the regeneration in that strip has achieved free-to-grow status, the average age of the dominant tree species in each of the strips should be determined and then used to calculate the appropriate year of origin for the entire stand. At this point, understory forest stand characteristics are no longer required at this point.

Normally, updates to the year of origin have a corresponding change to the year of update attribute as this indicates the currency/vintage of the information and the year that the year of origin was determined. Year of origin information is not required for non-forested and non-productive forest land types.

Physical Forest Stand Attributes

Productive Forest Modifier

The productive forest modifier attribute provides a further classification of productive forest area into production forest, production forest – designated management reserve, and protection forest areas. The productive forest modifier must be identified for every productive forest stand and must be used in conjunction with the management consideration attribute. Figure B-11 identifies the different productive forest modifiers and their relationship to the management consideration attribute.

Production Forest

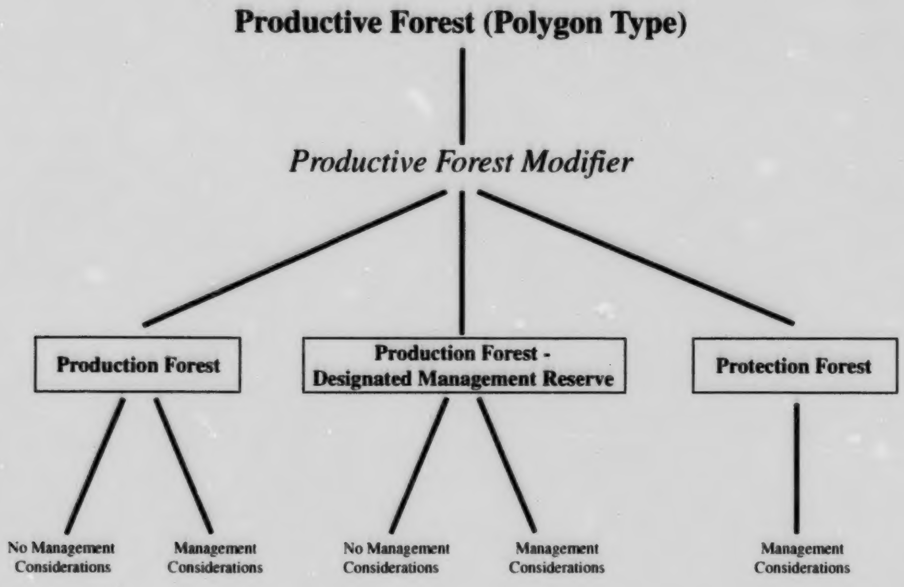
These are areas at various stages of growth and development, with no significant physical or biological limitations on their capability to support forest management activities. Production forest areas are capable of producing adequate growth of timber to support harvesting on a sustained yield basis. Production forest also contains areas that have recently been harvested, depleted naturally, or recently renewed, but remain capable of supporting timber growth and, therefore, contributing to a sustainable harvest. Production forest areas are normally considered available for forest management.

Production forest areas may also include areas which pose an operational challenge in terms of harvest, access, protection, silviculture, or renewal. These areas were formerly called production forest reserves. These areas may include sites with steep slopes, shallow or exposed fine textured soils, rocky areas, ravines, or stagnated tree growth that require management consideration. The management considerations, which are applicable to the production forest, provide indicators for consideration in forest management planning.

Production Forest – Designated Management Reserve

These are productive forest areas, which are considered as production forest, but that are unavailable for timber production as determined through forest management planning. These areas have been identified as no-cut areas through AOC planning (e.g., reserve buffers applied to protect fisheries values, tourism values, riparian areas/water quality, etc.). Designated management reserves are actual operational reserves or management reserve areas created by the implementation of forest management operations. Designated management reserves do not include areas identified for other land uses, such as ownership and land tenure, and parks and reserves.

Figure B-11 Classification of productive forest areas into productive forest modifier attribute and its relationship to the management consideration attribute.


Productive Forest (Polygon Type)
Productive Forest Modifier
Production Forest
Production Forest - Designated Management Reserve
Protection Forest
No Management Considerations
Management Considerations
No Management Considerations
Management Considerations
Management Considerations

Protection Forest

These areas may have adequate timber growth but pose a significant operational challenge or risk in terms of forest management and site protection. These areas may include sites with steep slopes, shallow or exposed soils, rocky areas, ravines, permafrost, stagnated tree growth, moving ground water or high water tables. These areas have been designated as reserves for the purpose of protecting a specific site or ecosystem and are excluded from forest operations. All factors/site features, which exclude a site from forest operations, must be identified as management considerations.

All productive forest areas that were formerly designated as production forest reserve (PFR) or protection forest (PF) stand types must be reclassified into the appropriate productive forest modifier, based on the above definitions for production forest, production forest – designated management reserve, and protection forest. All operational reserves (or buffers) which have been created as a result of implementing forest management operations, must be identified as a production forest – designated management reserve. As productive forest areas are encountered or impacted by forest operations conducted in accordance with an approved plan, the appropriate management considerations must be identified.

Stage of Development

The stage of development represents the current development state, and/or the current stage of silvicultural management of a productive forest stand. Productive forest polygons (forest stands) can be described by following ranges of forest stand development or management:

- **a)** Below Regeneration Standards
- **b)** Depleted (harvest or natural depletion, complete or partial harvest)
- **c)** Renewed (artificial or natural)
- **d)** Free-growing (not depleted)
- **e)** Free-growing (depleted by silviculture system)

The ranges of forest stand development provide a progression of forest growth and development ranging from depleted to renewed to various free-growing states. The other development range, below regeneration standards, identifies productive forest areas which do not meet regeneration standards according to the silvicultural ground rules in an approved forest management plan, and require further silvicultural treatment to bring these forest stands up to a free-growing condition. Some stages of development can only be described by the most recent forest management operation applied to a forest stand.

Forest management operations, which are used to describe a specific stage of development, are not in any way considered as a silviculture tracking system that may be maintained by either an SFL holder (plan holder) or the MNR. The intent of recording specific forest management operations as an indicator of the stage of development is to provide an indication of potential growth and development for productive forest areas, based on the time since the last operation was conducted.

Table B-2 contains the valid choices for the stage of development attribute. Appendix III contains the Stage of Development Validation Look-up Table. Only one of the values in this table may be entered for this attribute. Sustainable forest licence holders (plan holders) are required to identify the stage of development that best describes the current state of growth or management for a productive forest stand.

The different stages of development are logically associated with one of the three basic silvicultural systems: clear-cut, shelterwood, or selection. Clear-cut and shelterwood silvicultural systems are considered even-aged management systems while the selection silvicultural system is an uneven-aged/all-aged system of management. In this sense, the silvicultural system also provides an indication of forest structure in terms of canopy layers (stories) and age-class structure. The silivicultural system, when used in conjunction with specific silvicultural treatments (planting, mid-rotation tending) or harvest method (shelterwood stage, seed cut, or selection improvement cut), provides a good indicator of the stage of development and the expected response and growth for a given forest stand.

Table B-2 Stage of Development – Productive Forest Areas

Range of Development	Associated Silviculture System	Forest Polygon Coverage Stage of Development
Below Regeneration Standards	na	Below Stocking/FTG/FGWS Regeneration Standards Due to Past Management
		Below Stocking/FTG/FGWS Regeneration Standards Due to Natural Causes/Succession
Depleted	Clear-cut	Recently Depleted & No Regeneration/ Renewal Treatment – Harvest
		Recently Depleted & No Regeneration/ Renewal Treatment – Natural Causes
Renewed	Clear-cut	Recently Renewed – Planted Recently Renewed – Seeded Recently Renewed – Natural
Free Growing (not depleted)	Clear-cut	FTG/FGWS (SEM) – Planted FTG/FGWS (SEM) – Seeded FTG/FGWS (SEM) – Natural
		Received Mid-Rotation Pre-commercial Thinned/Spaced/Tended Treatment
Free Growing (depleted)	Clear-cut	Received Mid-Rotation Commercial Thinned/Spaced Harvest
		Received Strip/Block/First Pass Harvest/Seed Tree Cut
		Received CLAAG/HARO/HARP Harvest/ Treatment
Free Growing (depleted)	Shelterwood	Received Prep. Cut Received Seed Cut Received First Removal Harvest Received Final Removal Harvest
Free Growing (depleted)	Selection	Received Improvement Cut Received Selection Harvest

FTG – Free To Grow
FGWS – Free Growing, Well Spaced
CLAAG – Careful Logging Around Advanced Regeneration
HARO – Harvest and Regeneration Option
HARP – Harvest with Regeneration Protection
SEM – Silvicultural Effectiveness Monitoring (Guideline)

The stage of development represents actual management which has been carried out at the forest stand level, but does not include decisions or forecasts of how a particular forest stand may be managed in the future. The following sections describe the different stages of development, which are applicable to each range of development, as illustrated in Table B-2.

Below Regeneration Standards Range of Development

Productive forest stands that do not meet the regeneration standards in an approved forest management plan, primarily due to natural or artificial disturbances, must be classified into one of the below regeneration standards stages of development. These stages of development include areas which were previously depleted and have not reached the regeneration standards as described in an approved forest management plan within the estimated timeframe (free-to-grow period).

Productive forest areas which are designated as below regeneration standards require further silvicultural treatment to bring them up to regeneration standards. The origin of these areas, as either from harvest or natural depletion, must be identified as part of the attribute.

These areas may include productive forest areas which have received renewal treatments in the past that have failed to produce a regenerated forest to the applicable regeneration standards. These areas may also include productive forest areas which have traditionally been designated as barren and scattered (stocking value is less than 0.25 or 25 percent) and areas that have been classified as not satisfactorily regenerated (NSR). The former NSR classes 2 to 5, which required various levels of tending or re-treatment, may be included in the below regeneration standards.

Areas that have recently been depleted or recently renewed must not be included in the below regeneration standards stages of development. Similarly, forest stands that have not yet received an SEM survey, or that have not been assessed for free-to-grow conditions, must not be classified as below stocking standards.

Forest stands that are classified into one of the below regeneration standards stages of development must have a completed set of forest stand description attributes.

Depleted Range of Development

The depleted range has two stages of development that indicate whether a productive forest area was recently depleted by clear-cut harvesting or by natural causes (fire, blowdown, ice damage, insect & disease). Areas that have been depleted by natural causes should be consistent with the areas that have been reported as naturally depleted in annual reports.

The depleted stages of development apply to productive forest areas that are normally managed under the clear-cut silvicultural system and include forest stands that have one characteristic year of origin. Productive forest areas, which have been recently depleted either by harvesting or natural means and which have not received a silviculture treatment such as natural regeneration, seeding or planting, are classified with the applicable Recently Depleted & No Regeneration/Renewal Treatment stage of development.

Productive forest stands which are classified into one of the recently depleted stages of development represent areas that are not associated with a free-growing condition. These areas do not have advanced regeneration, or a distinct or established regeneration layer that would be released and/or protected as part of the depletion operation. These areas also do not have a portion of the forest stand that is free-growing such as in certain modified clear-cuts (strip/block cut), shelterwood, or selection harvests. Productive forest stands which have advanced regeneration or an established regeneration layer, which is considered as part of the harvest depletion under a clear-cut, shelterwood, and selection silvicultural system, are described by the various free-growing stages of development.

Forest stands that have been partially depleted, such as in certain modified clear-cuts (strip/block cuts) or harvest depletions that promote advanced regeneration, are not included in this range of development stages. These areas should be classified as Received Strip/Block/First Pass Harvest/Seed Tree Cut within the free-growing (depleted) stage of development.

Similarly, areas that have recently been depleted under a clear-cut silvicultural system but that depend on natural regeneration to renew the productive forest area must not be classified as Recently Depleted & No Regeneration/Renewal Treatment. These areas should be classified as either Recently Renewed – Natural within the renewed stage of development or as Received CLAAG/HARO/HARP Harvest Treatment within the free-growing (depleted) stage of development.

Renewed Range of Development

There are three stages in the renewed ranges of development, based on the type and origin of regeneration occurring in a forest stand: Planted, Seeded and Natural.

All three stages in the renewed range of development are normally associated with the clear-cut silvicultural system. These stages identify productive forest areas which have been depleted by harvesting or by natural causes and which have been predominantly regenerated by either planting, seeding, or natural means, but have not received an SEM survey and have not been assessed as free-to-grow. Under the former classification of NSR areas, these productive forest areas would have been classified as NSR 6. In some cases, areas formerly classified as NSR 2 or NSR 3 could also occur in the renewed range of development.

Sites that have been planted with 50 percent or more planting stock (containers, or bareroot) in terms of area or stocking are classified as Recently Renewed – Planted. Sites where 50 percent or more of the area or stocking of the regeneration has developed from manual, broadcast, or aerial seed are classified as Recently Renewed

– Seeded. Sites where 50 percent or more of the area or stocking of the regeneration has developed from natural sources (sprouting, suckering, or seed) are classified as Recently Renewed – Natural.

Where a mixture of renewal treatments has been applied to one forest stand, the dominant regeneration type, as either planted, seeded, or natural should be determined.

Free Growing (Not Depleted) Range of Development

Free Growing (not depleted) – Clear-cut Stage

Productive forest stands that are managed under the clear-cut silviculture system which have not been recently depleted, but have been renewed and have been assessed as free-to-grow based on an SEM survey, are classified as free-growing stands. The dominant regeneration type must be identified as either planted, seeded, or natural for these stands. These three free-growing stages of development may represent productive forest stands over a wide range of ages and development, from recently assessed free-to-grow areas to mature and overmature forest stands. In many cases, where mid-rotation treatments are not required, a productive forest stand may remain in the applicable free-growing (not depleted) stage of development from the time that the stand is assessed as free–to-grow until it is harvested (50 to 140 years depending on the rotation period).

Productive forest stands that are managed under the clear-cut silvicultural system, and that have recently received a mid-rotation treatment (tending, thinning, spacing) that is considered to be a pre-commercial treatment, must be classified as the Received Mid-Rotation Pre-commercial Thinned/Spaced/Tended Treatment stage of development. A pre-commercial treatment does not result in the harvest of merchantable volume and is, therefore, not considered to result in a depleted area.

Free Growing (Depleted) Range of Development

The free growing (depleted) stages of development provide a wide range of mature, growth and development states. There are three divisions within this range of development, based on the silvicultural system applied:

Free Growing (depleted) Clear-cut System
Free Growing (depleted) Shelterwood System
Free Growing (depleted) Selection System

Determining which silvicultural system to employ on a forest stand is a forest management planning decision, and is reflected in the planning inventory (see Section 5.3).

Free Growing (depleted) – Clear-cut System

These productive forest areas remain in the free-growing state but have been partially depleted and have recently been, or will be, reported as depleted areas in annual reports. There are three stages of development for productive forest stands that are managed under variations (modifications) of the clear-cut silvicultural system.

> *Received Mid-Rotation Commercial Thinned/Spaced Harvest:* In this stage of development the remaining trees have been selected to meet various objectives to optimize spacing, remove species that are not suited to the productivity of the site, and promote growth of the best quality stems and trees that will benefit by a release from competition.
>
> *Received Strip/Block/First Pass Harvest/Seed Tree Cut:* In this stage of development only part of the forest stand has been removed. The non-depleted portion of the forest stand is left primarily to provide a natural seed source to regenerate the depleted area. There are several patterns, all of which are referred to as modified clear-cuts, that result in a partial clear-cut, with two or more stories of a forest stand that have different ages of trees. The remaining non-depleted area will be harvested when the regeneration that was established in the original depleted area achieves free-to-grow status based on the regeneration standards and an SEM survey. The regenerated portion of the forest stand should be described by the understory forest stand characteristics (see Understory Forest Description Component).
>
> *Received CLAAG/HARO/HARP Harvest/Treatment:* This stage of development describes a wide range of combined harvesting and regeneration treatment options that either protect and promote the existing regeneration layer (referred to as advanced regeneration) and/or promote natural regeneration (seeding) options.

Free Growing (depleted) – Shelterwood System

There are four, free-growing – stages of development, based on the uniform shelterwood system of management:

> *Received Preparatory Cut:* This treatment may or may not result in a depleted area, depending on whether merchantable volume has been removed from the forest stand. The preparation cut is designed to remove undesirable species and to select trees that will provide the best seed source.
>
> *Received Seed Cut:* This cut is designed to create spaces and prepare sites for natural seed germination while maintaining the seed bearing trees and protecting any existing advanced regeneration. This stage of development normally reduces the basal area of desirable species and is considered as a depleted area.

Received First Removal Harvest (or Second Removal): This cut involves the removal of the trees from the overstory in one or more harvests and results in a depleted area. Where only a partial removal of the overstory occurs, the stage of development should reflect a first removal.

Received Final Removal Harvest: This cut is similar to the first removal and involves the removal of all trees in the remaining overstory. The overstory, once removed, provides a release of the understory, which is normally free-to-grow.

The stages of a shelterwood silvicultural system may be modified or combined in different ways. The best approximation of a particular shelterwood stage should be determined for each productive forest stand. For example, if a preparation cut and a seed cut have been combined into one operation, the stage of development should be recorded as Received Seed Cut. The different shelterwood stages perpetuate free-growing conditions in that either the understory, the overstory, or both may be free-to-grow at different points in time (i.e., a productive forest stand in each free-growing shelterwood stage of development is normally considered as free-to-grow).

The regeneration standards for forest stands managed under the shelterwood system apply more to the remaining or residual growing stock after the operation has been conducted. Forest stands managed under the shelterwood silvicultural system characteristically have two distinct canopy layers or stories (the overstory and an understory). The understory forest stand description information must be completed for forest stands that are managed under the shelterwood silvicultural system and that have received a first or final removal treatment (see Understory Forest Description Component). Understory information may also be required if a regeneration layer exists, as a result of a seed cut or a combination of preparation, seed, and/or removal treatments/cuts.

Free Growing (depleted) – Selection System

The free growing – selection range of development can be described by two stages:

Received Improvement Cut: Forest stands that require a modification/ improvement to the distribution of stems, quality of stems, and species composition for future management under the selection silvicultural system.

Productive forest stands that have received an improvement harvest may, or may not, be considered as a depletion (depleted area) depending on whether merchantable volume was removed from the stand. Improvement cuts normally occur in polewood-sized stands where improving the quality of stems, selecting the best species for the site, and optimizing the current spacing are the silvicultural objectives. Improvement cuts may also occur on forest stands that have an over-abundance of poor quality stems. The time required for forest stands, that have received an improvement harvest, to enter into a true selection system of management may vary. These types of forest stands that have received an improvement cut and that are intended for future management under the selection system should be identified by the Received Improvement Cut – stage of development.

Received Selection Harvest: Forest stands that have received a selection harvest, are managed under the selection system, and have a specified cutting cycle (or return period) for a subsequent selection harvest.

Productive forest stands that are managed under the selection silvicultural system have continuous canopy development such that distinct canopy layers or stories cannot readily be distinguished. Forest stands managed under the selection system are perpetually free-to-grow. The regeneration standards for selectively managed stands relate more to the distribution of stem sizes and the quality of the remaining trees. Age is not a reliable indicator of development for forest stands managed under the selection system, as the trees are more representative of an all-aged forest. Forest stands that have received a selective harvest based on a stable cutting cycle, should be identified by the Received Selection Harvest -stage of development.

Forest stands identified by either the Received Improvement Cut or Received Selection Harvest – stage of development must include a complete description for the Basal Area Distribution attribute.

The stage of development is a partial replacement for the former "Stand Type" attribute that exists in traditional FRI "STANF" inventories. Stage of development more accurately represents the current state of growth and expected development of a productive forest stand. All former stand types must be converted to a stage of development. The conversion from stand type to stage of development is further described in section 5.1.3.2.6 and must be completed prior to submitting a forest polygon coverage in either a stewardship inventory or a planning inventory collection, as prescribed in Sections 5.2 and Section 5.3, respectively.

Management Consideration

The management consideration attribute describes the landscape features or site conditions of a productive forest polygon that indicate a management challenge or potential site sensitivity in terms of harvest, renewal, protection, or maintenance of a forest stand. Appendix III contains the Management Consideration Validation Look-up Table. All applicable management considerations should be listed for each productive forest stand. Therefore, more than one value from the look-up table may be identified.

The management consideration attribute, which must be used in conjunction with the productive forest modifier, replaces the former production forest reserve and the protection forest stand types. Appendix IV provides the cross-reference from the former production forest reserve and protection forest classifications to the appropriate productive forest modifier and management consideration attributes. As these forest stands are surveyed, inspected, harvested, and renewed through the implementation of forest management operations, the information collected will be used to update and/or verify the management consideration attributes for each site.

Management Consideration – Dealing with Bypass Area

If productive forest areas, which are planned for harvest in accordance with a forest management plan, have been bypassed during the implementation of forest operations, the bypass area must be identified by the applicable productive forest modifier and the applicable management consideration. A decision to designate a bypass area into one of the productive forest modifier types is based on the reason for the bypass. The reason for bypass must be supported by the applicable management considerations (see Management Consideration Look-up Table).

If a productive forest area is bypassed due to biological or physical limitations of tree growth, site conditions, or operability, a decision must be made to designate the area as either protection forest or production forest, based on the severity of the limitation. In either case, a minimum of two management consideration options must be identified (one being bypass and the other the limiting factor(s)). Bypass areas must not be identified as production forest – designated management reserve, for the purpose of updating the productive forest modifier.

Productive forest areas may also be bypassed when implementing forest management operations due to marketability reasons (no economic market for some tree species) or due to immaturity/over-maturity/misrepresentation (forest stand was not old enough, stand break-up/succession made harvest uneconomical/inoperable, or forest stand description information was not accurate). These types of bypass areas should not be identified by the management consideration attribute. Bypass due to marketability reasons is not identified in the forest polygon coverage since it results from a management planning decision at the time forest operations are implemented. Normally, these areas would be identified as planned surplus areas in a forest management plan, which also reflects a management planning decision.

Bypass due to immaturity/over-maturity/misrepresentation normally represents a situation in which the FRI did not accurately represent the forest stand description information for the productive forest area. In this case, the forest stand description information must be updated and modified to reflect the actual description of the productive forest area.

Accessibility Indicator

The accessibility attribute indicator identifies the type of access restriction(s), if any, to a productive forest stand due to political, land use policy, legal, or natural barriers. Islands, peninsulas and roadless wilderness areas are examples of productive forest areas that may not be accessible, are land-locked, and/or are technically not available for forest management purposes. Appendix III contains the Accessibility Indicator Validation Look-up Table. More than one type of access restriction may be entered.

5.1.3.2.5 Forest Stand Characteristics

The remaining forest stand description attributes are referred to as forest stand characteristics (see Table B-1) that must be completed for all productive forest areas on Crown lands. The detail required in the forest stand characteristic attributes varies depending on the stage of development, as described in Table B-2.

The forest stand characteristics are divided up into three groups of attributes based on the silvicultural system as it applies to the stage of development attribute:

1. Forest stand characteristics that are required for all productive forest stands, regardless of the silvicultural system:

    Species Composition
    Working Group
    Height
    Stocking
    Site Class
    Age Structure Indicator
    Ecosite
    Ecosite Source of Data Update

2. Additional forest stand characteristics that are required for stands managed under the selection silvicultural system:

    Basal Area Distribution

3. Additional forest stand characteristics that are required for forest stands managed under the shelterwood silvicultural system, the Received Strip/Block/First Pass/Seed Tree Cut or the Received CLAAG/HARO/HARP Harvest/Treatment (free growing – clear-cut – stages of development):

    Understory Species Composition
    Understory Year of Origin
    Understory Stocking
    Understory Height
    Understory Site Class
    Understory Working Group

Table B-3 provides a reference for the type of data and detail required in each of the common forest stand characteristic attributes, based on the different stages of development. Sustainable forest licence holders (plan holders) must create and update the forest stand characteristics in accordance with the details provided in this table. The understory attributes must also be completed for the Strip/Block/First Pass/Seed Tree Cut and the CLAAG/HARO/HARP Harvest/Treatment stages of development in accordance with Table B-3.

Table B-3 Checklist of Forest Stand Characteristics Required for Different Ranges of Development and Silvicultural System

Range of Development/ Silvicultural System	Species Composition	Stocking	Height	Site Class	Working Group	Age Structure Indicator	Ecosite
Below Regeneration Standards	Full & accurate information required for all attributes						
Depleted/ Clear-cut	Pre-harvest Species Composition	0.0	0.0	Pre-harvest Site Class	Pre-harvest Working Group	E – Even Aged	Pre-harvest Ecosite
Renewed/ Clear-cut	Regenerated Species 100%	Estimated Stocking of Regeneration	Height of Regeneration	Site Class of Regeneration	Working Group of Regeneration	E - Even Aged	Pre-harvest Ecosite
Free Growing (not depleted)/ Clear-cut	Full & accurate information required for all attributes based on SEM results						
Free Growing (depleted)/ Clear-cut	Full & accurate information required for all attributes based on SEM results						
Free Growing (depleted)/ Shelterwood	Full & accurate information required for all attributes based on SEM results						
Free Growing (depleted)/ Selection	Full & accurate information required for all attributes based on SEM results						

Note: The *Basal Area Distribution* information must be completed for productive forest stands managed under the selection silvicultural system and the Understory attributes must be completed for forest stands managed under the shelterwood silivicultural system. The understory attributes are also completed in accordance with this table.

Forest stands that can be classified into one of the free-growing stages of development normally require updates to the forest stand characteristics that are based on analyzing the results collected from SEM surveys or assessments.

For the depleted and renewed stages of development, an SEM survey or assessment would not normally have been conducted. Consequently, an accurate species composition, stocking, height, and several other forest stand characteristic attributes cannot be completed. Therefore, the pre-harvest condition or estimates of the forest stand characteristics for these productive forest areas must be provided in lieu of actual data measurements. The estimates will be verified as SEM surveys are conducted.

Productive forest areas that are managed under the clear-cut silvicultural system, and which have been recently depleted, must maintain the pre-harvest working group. The species composition will indicate the pre-harvest (before harvest) species composition. Recently depleted areas must also have the stocking and height attributes set to a value of zero. The site class should represent the pre-harvest site class. The age structure indicator will be even-aged and the ecosite attribute should also reflect the pre-harvest condition (the ecosites are confirmed or verified with the applicable forest operations prescription during annual operations planning).

Productive forest areas that are managed under the clear-cut silvicultural system, and which have recently been renewed, must have an estimate of the species composition based on the regenerated or regenerating species. The species composition and the working group should represent the species regenerated. The stocking, site class, and height are also estimates based on the renewal operation. The age class structure will be even-aged and the ecosite attribute should reflect the pre-harvest condition similar to a recently depleted forest stand.

The forest stand characteristic attributes for productive forest stands in any of the free-growing stages of development should be updated based on information collected from SEM surveys or other appropriate methods. The standards for each of the forest stand characteristic attributes apply. The basal area distribution attribute must be completed for all productive forest stands managed under the selection system and must represent the post-harvest condition (i.e., the basal area reflects the residual basal area of the forest stand after harvest). Basal area distribution information may also be required for productive forest stands that are managed under the shelterwood silvicultural system, if basal area forms part of the regeneration/management standards for that forest unit and site type combination in accordance with the silvicultural ground rules in an approved forest management plan.

The understory attributes must also be completed for productive forest stands managed under the shelterwood system, if they have received any of the removal harvests. Productive forest stands that have received a preparation cut normally do not require understory attribute information but understory attribute information may apply to productive forest stands that have received a seed cut. If an understory layer (regeneration layer) is present after a seed cut or seed cut treatment combination has occurred, the understory attributes should be completed based on the results of SEM surveys. Similarly, forest stands with a stage of development of Received Strip/Block/First Pass Harvest/Seed Tree Cut or Received CLAAG/HARO/HARP Harvest/Treatment should reflect the appropriate understory attributes (see Table B-3).

Species Composition

Species composition identifies the tree species in a forest canopy, along with the percentage of cover that each tree species occupies within the canopy. Species composition is most representative of the overstory canopy (dominant and co-dominant trees), since much of this information is interpreted from aerial photography (or similar methods from above the canopy). Species composition may also be influenced by ground sampling methods, such as basal area tallies, that may capture overstory canopy species composition along with understory information.

Traditional FRIs contained species and percentage of forest cover data that were limited to a maximum of ten pairs, and the forest cover percentage values were rounded to the nearest ten percent. Species composition in the forest polygon coverage may have any number of species and forest cover percentage pairs. Forest cover may be expressed to the nearest (whole-number) percentage. Appendix III contains the Species Validation Look-up Table. Only the values in the look-up table may be entered into this data field. All forest cover percentages for a forest stand must add up to 100 percent.

Working Group

The working group represents the dominant species in a forest stand, based on the tree species that occupies the greatest canopy closure or basal area in relation to the species composition. Appendix III contains the Working Group Validation Look-up Table. Only one of the values in the look-up table may be entered into this data field. The look-up table also contains the acceptable tree species which occur in each valid working group. The technical specifications prescribed by the conditions in Section 5.1.3.5 describe the process rules for determining the working group when two or more tree species occupy the same canopy closure or basal area (forest cover percentage) in a forest stand.

Height

The height attribute represents the average height (in metres) of the dominant tree species (normally the working group species) in a forest stand. Height is usually determined for the working group species and is usually determined from aerial photo-interpretation or field measurements. Height may be recorded to the nearest 1/10 (0.1) of a metre, based on measured survey data, or can be recorded in one-metre height classes, based on aerial photo measurements. Height is a critical element in determining the site class of productive forest stands based on age (determined from the year of origin and the year of update).

Stocking

Stocking is a qualitative measure of the density of tree cover in a forest stand. Stocking represents the density of forest stems based on average age, height, and the working group (the dominant tree species) in a forest stand. It is expressed as a percentage value ranging from zero, for recently depleted stands, to a maximum of 2.5 for free-growing stands. Stocking is determined by comparing the actual basal area measured from field sampling to the relative basal area of a fully-stocked stand using Plonski's Normal Yield Tables (Plonski's Normal Yield Tables were developed from permanent sample plots established for several of the major tree species in Ontario). Stocking can also be determined from aerial photography based on the degree of canopy closure, average age, height, and species composition. Actual basal area collected from field sampling is used to calibrate stocking assessments made from photo-interpretation.

The silvicultural ground rules in a forest management plan describe the standards for assessing the regeneration of forest stands, based on forest unit, desired species composition, age, height, and stocking. If the stocking of a productive forest stand does not meet the regeneration standards in the silvicultural ground rules of an approved forest management plan, the forest stand will be considered as NSR and must be classified into the appropriate below regeneration standards stage of development.

In some cases, the regeneration and/or management standards of a silvicultural ground rule may be expressed as a *density,* which usually describes the frequency or number of stems per hectare. Density information may be collected from SEM surveys for the purpose of assessing whether regeneration and/or management standards for a specific silvicultural ground rule and silvicultural treatment have been met. Where density information (stems/hectare) has been collected or determined from an SEM survey, this information must be converted to a stocking value for the purpose of updating the forest stand description information.

Site Class

Site class is an indicator of site productivity and is determined using the average height, age, and working group, based on the dominant tree species in a forest stand. These attributes are compared against height and age growth curves in Plonski's Normal Yield Tables for different species to determine the relative growth rate for a forest stand.

Site class has five acceptable values: 0, 1, 2, 3, or 4. Note that site class "0" replaces the former site class value of "X". This conversion must be applied to all productive forest stands in the forest polygon coverage. Appendix III contains the Site Class Validation Look-up Table. Only one of the values in the look-up table may be entered into this data field.

Age Structure Indicator

The age structure indicator provides an indication of whether the age range of the trees in a forest stand is considered to be even-aged or uneven-aged. All productive forest stands must have an age class indicator.

Even-aged forest stands are composed of trees having no, or relatively small, differences in age (usually less than 10 to 20 years). Even-aged forest stands have trees that are approximately the same age and have one age class, or may have two distinct age classes that have developed as a result of management (shelterwood or modified clear-cuts) or by natural means.

Uneven-aged (all-aged) forest stands have considerable differences (usually greater than 10 to 20 years) in the age of the trees. Uneven aged forest stands may have three or more age classes or a continuous range of ages. Uneven-aged forest stands are normally managed under the selection silvicultural system.

Ecosite

Ecosite is also referred to as site type. Ecosite must be identified for all free-growing, (free-to-grow) forest stands based on the pre-harvest condition, and must reflect the characteristics of the site in terms of vegetation, soils, drainage, and tree species in accordance with a forest ecosystem classification. Determination of ecosite is a pre-requisite of scheduling a forest stand for silvicultural treatment and is required for verifying the selected forest operations prescription in accordance with the silvicultural ground rules of an approved forest management plan. Ecosite should not be determined after a forest stand has been subjected to forest management operations.

Ecosite is most applicable and suited to classifying mature forest stands. The determination of ecosite is based on several factors such as climate, slope, aspect, soil characteristics and development, drainage, vegetation, and tree species compositions. These factors have been incorporated into three regional forest ecosystem classification systems which are applied in Ontario.

Appendix III contains the Ecosite Validation Look-up Table. Ecosites contained in this look-up table reference the silvicultural guidelines used in forest management planning as prescribed by the *Forest Operations and Silviculture Manual*. Ecosite information is expressed as pairs of data attributes, similar to species composition, where ecosite or site type is paired with the percentage of stand area occupied by each ecosite or site type. The sum of the percentages for each ecosite/site type occurrence must add up to 100 percent.

Ecosite is a transitional attribute that is required as forest stands are encountered in forest management planning and implementation of forest management operations. Ecosite information which is collected or created in accordance with an ecosystem classification (e.g., wetlands ecosystem classification) may also be entered in the ecosite attribute for non-productive forest lands.

Ecosite Source of Data Update

The Ecosite Source of Data Update attribute identifies how the ecosite attribute was determined. Appendix III contains the Ecosite Source of Data Update Validation Look-up Table. Only one of the values identified in this look-up table may be entered into this data field. The options for the ecosite source of data update attribute must identify whether the ecosite was determined through algorithmic methods or analysis of other data sources, or confirmed through field surveys or inspections (data collection).

Basal Area Distribution

Basal area distribution represents eight measurements of basal area which are distributed over two quality classes (representing stem quality, tree form, and vigour) and over four, broad diameter class ranges. Basal area data is required only for forest stands that are currently managed, or have been managed, under a selection system. Forest stands managed under the selection system are identified by the stage of development attribute as having received an improvement cut or a selection harvest. Basal area data must be determined as a result of conducting an SEM survey. The document entitled *A Tree-Marking Guide for the Tolerant Hardwoods Working Group in Ontario* provides further reference to this information.

Basal area is the sum of area in square metres of all trees that are greater than 10 centimetres in diameter when measured at breast height with either a prism (calibrated at two square metres/hectare – prism factor of 2) or a circumference/diameter tape in a fixed area plot. Basal area is measured in one horizontal plane that is 1.3 metres above the ground and is referred to as a breast height measurement.

Stand quality is a subjective determination of whether the individual trees are suitable for timber production based on a visual assessment of stem form (straightness), canopy form, general health and vigour, and external evidence of defects or disease.

Basal area must be determined for two stand quality classes:

> *Acceptable Growing Stock*
> Trees that are considered as acceptable growing stock (AGS) exhibit good health, vigour, and form and are expected to maintain or improve their present quality over the next 20 years (or cutting cycle term). Trees of AGS quality are visually free of defect and disease.
>
> *Unacceptable Growing Stock*
> Trees that are considered as unacceptable growing stock (UGS) exhibit poor health, poor vigour, or poor form and are expected to decline in quality over the next 20 years (or cutting cycle term).

Basal area measure is further broken down into four diameter class ranges:

Polewood	10 – 24 centimetre diameter class
Small Sawlogs	26 – 36 centimetre diameter class
Medium Sawlogs	38 – 48 centimetre diameter class
Large Sawlogs	50+ centimetre diameter class

Basal area is measured in square metres/hectare and must be determined for each quality class (AGS and UGS) and each diameter class range combination. Therefore, eight measurements of basal area are required.

Basal area distribution data may also be determined for some productive forest stands which are managed under the shelterwood silvicultural system. If SFL holders (plan holders) collect and use basal area data for managing forest stands under the shelterwood system, this information must be provided with the forest polygon coverage.

Basal area distribution data is a transitional attribute that must be collected as forest stands are encountered in forest management planning or through the implementation of forest management operations (marking prescriptions, SEM surveys). The basal area distribution data for forest stands managed under the selection silvicultural system may be collected as pre-harvest data, usually as part of the marking operation, or as post-harvest data (SEM surveys). Basal area information is used to assess the effectiveness of forest operations (selection system) by comparing the residual basal area by quality class to the applicable regeneration standards and/or management standards in the silvicultural ground rules of an approved plan.

In some cases, basal area distribution data exists from past records maintained by forest companies or MNR district offices. The MNR may enter into arrangements or agreements with SFL holders (plan holders) other forest resource licence holders or third parties for the purpose of utilizing such records to update FRI information.

Understory Forest Description Component

Understory data is required for forest stands that have two or more distinct stories (layers or canopies) of trees species, which are normally separated by a distinguishable difference in age (usually 20 years or greater) and/or height. If more than two distinct layers of a forest canopy exist (as in a third strip or block cut or in multi-storied forest stands), the understory data must describe the youngest tree canopy.

Understory data is required for forest stands that are managed under the shelterwood silvicultural system. In some cases, understory data is required for forest stands managed under the clear-cut silvicultural system, where the stage of development is identified by Received Strip/Block/First Pass Harvest/Seed Tree Cut, or Received CLAAG/HARO/HARP Harvest/Treatment.

Understory information must be collected when forest stands have received an SEM survey in accordance with the silvicultural ground rules of an approved forest management plan. Understory information is only required to be updated in an FRI based on the frequency of conducting SEM surveys. The same standards for overstory forest description information apply to the understory attributes:

Understory Species Composition
Understory Year of Origin
Understory Stocking
Understory Height
Understory Site Class
Understory Working Group

In the case of Received Strip/Block/First Pass Harvest/Seed Tree Cut, or the Received CLAAG/HARO/HARP Harvest/Treatment stages of development, where two distinct stories exist, the understory attributes should reflect the regeneration in the recently depleted and or recently renewed strip, block, or pass. The overstory stand attributes should then reflect the forest stand characteristics in the unharvested strip, block, or pass.

The understory information must be maintained and updated based on data collected from SEM surveys until such time as the remaining strip, block, or pass (clear-cut system), or parent trees in a final removal stage (shelterwood system), have been harvested and the regeneration and/or management standards have been met. When all strips/blocks/passes have been regenerated, the overstory information must be adjusted to reflect the average conditions found on the entire area of the forest stand. In the case of a final removal stage in a shelterwood area, the former understory becomes the overstory and the forest description information should then reflect the new overstory. At this stage, understory information will no longer be required and the appropriate clear-cut or shelterwood free-growing stage of development should be determined.

5.1.3.2.6 Conversion and Transition Standards

This section identifies standards to ensure that tabular information maintained in a traditional FRI (referred to as STANF information) is converted, transferred or collected, and updated in the most effective manner. The common description attributes and the forest stand description attributes prescribed in Section 5.1.3.2 are grouped into three categories, based on their differences from traditional STANF tabular attributes: enhanced conversion attributes, enhanced transitional attributes and non-transitional attributes. The standards required for the conversion or transition to the attributes required in the forest polygon coverage are described in the sections that follow.

Conversion of STANF information to Forest Stand Description Attributes

As described in Section 5.1.3.2.3, a process to convert STANF tabular information to tabular forest stand description attributes must be applied prior to submission of the FRI (stewardship or planning inventory collection) as prescribed by this manual. The conversion process affects only the traditional STANF attribute called stand type. The Stand Type attribute represented several different types of information such as barren and scattered areas, protection forest areas, production forest areas, an indicator of canopy or stand structure, and areas which were interpreted as considerations for protection. All of these different types of information were maintained in one attribute. The conversion process takes the different types of information and separates them into the different forest stand description attributes, which provide more detail and a better organization of the information for forest management planning purposes.

All stand type attribute information, from a traditional STANF tabular file, must be converted to the applicable forest stand description attributes in the forest polygon as described by this section. Appendix IV provides a set of conversion tables that cross-references traditional "STANF" information based on the former "stand type" attribute to the following enhanced forest stand description attributes (referred to as enhanced conversion attributes):

Polygon Type
Productive Forest Modifier
Stage of Development
Management Consideration
Accessibility Indicator
Age Structure Indicator

Sustainable forest licence holders (plan holders) are required to convert their information related to the former stand type attribute into the above forest stand description attributes according to the cross-reference tables provided in Appendix IV. The conversion must be completed for all productive forest areas on Crown lands within a designated forest management unit. This conversion can be completed as an automated computer process or as an algorithm. The conversion does not affect spatial information, polygon identification, or area. The conversion process also does not result in a loss of detail with respect to the former stand type attribute.

The conversion tables provided in Appendix IV also allow for a reversal of the process to identify the original stand type if required, or to verify the results of the converted information. The MNR will assist SFL holders (plan holders) in converting former stand type information to the forest stand description attributes in accordance with the standards prescribed in Section 5.1.3.2. Any issues that result from the conversion of former FRI attributes, such as converting stand type to the productive forest modifier or stage of development attribute, should be dealt with by the applicable planning team members. As part of this attribute conversion process, the MNR may request the original STANF attributes before the conversion took place, to ensure that attributes have been converted in a consistent and accurate manner.

Transition to Forest Stand Description Attribute Standards

This transition standard applies to enhanced forest stand description attributes, which are different from the traditional STANF attributes. The conversion of stand type information to the applicable productive forest modifier, stage of development, management consideration, accessibility indicator, and age structure indicator attributes does not take advantage of the full enhancements to these attributes. As productive forest stands are surveyed, inspected, harvested, and renewed, the information collected from these operations will be used to verify the correct attribute information. This is considered a transitional period and requires that as productive forest stands are considered in forest management planning or encountered through the implementation of forest management operations, all forest stand description attributes will be verified and updated.

Other enhanced forest stand description attributes in the forest polygon coverage also require a transitional period in which information must be verified for completeness and checked for accuracy. The following attributes are considered as transitional attributes (referred to as enhanced transitional attributes) and must be verified as forest stands are managed or forest management operations are conducted:

Year of Last Depletion
Ecosite
Ecosite Source of Data Update
Basal Area Distribution
Understory Species Composition
Understory Year of Origin
Understory Stocking
Understory Height
Understory Site Class
Understory Working Group

Sustainable forest licence holders (plan holders) are not required to collect information for the enhanced forest stand description attributes for productive forest stands prior to the implementation date of the FIM. However, SFL holders (plan holders) may apply the transitional standards for collecting and updating information required for these forest stand description attributes for forest stands which have been managed in previous forest management plan terms.

Sustainable forest licence holders (plan holders) may possess information from previous surveys or operational records that may be used to update forest stand description attributes. Similarly, the MNR may also have information from previous records that can be used to accelerate the transition to enhanced forest description attributes. Sustainable forest licence holders (plan holders) and the MNR should jointly determine the most effective means of reducing the transition period for verifying and updating the enhanced forest stand description attribute information.

Non-transitional STANF Attributes

All other tabular attributes (attributes which are not considered as enhanced information) for common description information and forest stand description information must be transferred from the former STANF attributes. The descriptions of the following common description attributes and forest stand description attributes are essentially the same for the forest polygon coverage as the traditional FRI STANF attributes, and therefore do not require a transitional period (non-transitional attributes):

Common Description Attributes

Forest Management Unit
Mapsheet Number
Polygon Number
Polygon Area
Ownership Designation
Year of Update
Source of Data Update

Forest Stand Description Attributes

Year of Origin
Species Composition
Stocking
Height
Site Class
Working Group

Some minor changes apply to some of the attribute coding (e.g., site class "X" is now stored as site class "0" in the forest polygon coverage), but the description of the attribute remains the same. The common description attributes and the forest stand description attributes must be updated in accordance with the requirements, standards, and timelines for the stewardship inventory collection and the planning inventory collection as described in Sections 5.2 and 5.3, respectively.

The timelines to provide updated information for these non-transitional attributes may be retroactive to the date of implementation of this manual, based on the following factors:

- The date that FRI information held by the MNR was provided to SFL holders (plan holders) in accordance with the establishment of new SFLs which occurred as a result of the New Business Relationship initiative
- The first effective dates for provision of either a stewardship inventory collection or a planning inventory collection, or a composite planning inventory information product, as described in Sections 5.2 and 5.3

SFL holders (plan holders) will not be expected to provide updates to the non-transitional forest stand description attributes prior to the date they received FRI information from the MNR. Also, SFL holders (plan holders) are not required to provide updates to non-transitional forest stand description attributes prior to the start of the term of the previous forest management plan. These timelines to provide updated information for non-transitional attributes in consideration of the above factors are further described for the stewardship inventory and planning inventory information requirements, in Sections 5.2.4 and 5.3.4, respectively.

The MNxR may enter into arrangements with SFL holders (plan holders) or third parties for the purpose of updating or verifying forest stand description attributes (enhanced conversion, enhanced transitional, or non-transitional) in a forest polygon coverage using past and current records.

5.1.3.3 *Roles and Responsibilities for the Forest Polygon Coverage*

Sustainable forest licence holders (plan holders) are responsible for providing a forest polygon coverage in accordance with the requirements and standards as part of the submission of a stewardship or planning inventory information. They are also responsible for maintaining and updating the forest polygon coverage and must provide this information to the MNR in accordance with the timelines and conditions described in Sections 5.1.3.4 and 5.1.3.5.

The MNR is responsible for checking the forest polygon coverage which is submitted by an SFL holder (plan author) for completeness and must verify the accuracy of the updated information. These responsibilities are further defined in Section 5.2.3.3 (stewardship inventory) and in Section 5.3.3.1 (planning inventory).

The MNR must archive the forest polygon coverage with the stewardship or planning inventory collections. The MNR will treat the forest polygon coverage information, which is submitted by the SFL holder (plan holder), as the original information. The MNR must make copies of the forest polygon coverage prior to using the information for any purpose.

Sustainable forest licence holders (plan holders) are responsible for archiving their original copy of the forest polygon coverage information that is submitted to the MNR. In the case of any discrepancies regarding the information which is provided by an SFL holder (plan holder), the SFL holder (plan holder) will be considered as the holder of the source and original information.

5.1.3.3.1 Vintage of Information

The geographic location and description of each productive forest stand is current to the date that the information was last created or updated and is based on the date of photo-interpretation, imagery analysis, or field sampling. Much of this depends on the timing of forest management operations. The vintage of the information also depends on whether the forest polygon coverage has been created/updated for the purpose of preparing a stewardship or a planning inventory collection. The year of update attribute identifies the vintage or currency of the information maintained for each productive forest stand. The currency and vintage of information for individual forest stand polygons in a management unit will normally vary unless the FRI is completely reproduced/re-inventoried (i.e., new aerial photography, photo-interpretation, and creation of forest description information) for the entire management unit area.

The vintage of information for any productive forest stand should not be older than 25 years. This requirement applies to all productive forest stands in the forest polygon coverage, as required in either the stewardship or planning inventory collections. The only exception to this requirement applies to the basal area distribution and understory information, where the vintage of information for these attributes is based on the frequency of conducting SEM surveys, which in some cases may exceed every 25 years.

The vintage of information for any productive forest stand in the forest polygon coverage is determined by subtracting the timeline requirement for either the stewardship or planning inventory collection from the year of update for each productive forest stand. Sustainable forest licence holders (plan holders) are responsible for ensuring that the forest description information for productive forest stands meets this requirement.

5.1.3.3.2 Re-inventory

The responsibility to re-inventory the licenced Crown lands in a designated forest management unit rests with the SFL holders (plan holders). In areas where forest operations or natural changes have recently occurred, the information for those productive forest areas will be more up-to-date than in areas which have not been affected within the past 20 to 25 years. As the information in an inventory becomes out of date (> than 25 years), based on its vintage, SFL holders (plan holders) may employ one of two general strategies to update it:

a) Complete re-inventory
b) Continuous re-inventory

A complete re-inventory strategy is normally applied to all areas in a forest management unit. The more up-to-date information that is available for areas where forest operations or natural changes have recently occurred, is used to supplement the re-inventory process and allows more resources to be directed to updating information on areas which have not been affected. Traditionally, the MNR completed re-inventories of forest management units based on an average 20-year production cycle. The production process required three years, from initial aerial photography to field sampling, photo-interpretation, data automation, and quality assurance, which resulted in a completed, digital FRI.

A continuous re-inventory strategy focuses on those areas of a forest management unit that have not been affected by forest operations or natural changes within the last 20 to 25 years. The areas are scheduled to be re-inventoried as the vintage of the information approaches 25 years. Sustainable forest licence holders (plan holders) may employ the most efficient and cost-effective methods to implement a continuous re-inventory strategy provided that the updated information reflects the standards prescribed by the FIM. These methods may include, but are not limited to:

- Operational field cruising, surveys, samples
- Large-scale photography and analysis
- Satellite imagery and analysis
- Other methods that are capable of producing information described by the standards in Section 5.1.3.

Technology has changed significantly such that there are different ways to re-inventory a forest management unit area based on a complete or continuous re-inventory strategy. Sustainable forest licence holders (plan holders) may utilize any method as long as the resulting forest polygon coverage information meets the requirements and standards described by this manual. Depending on the method of update and data collection employed by an SFL holder (plan holder), the MNR may require access to the methodology, information analysis, or actual data collected to verify the accuracy of updated information. The MNR will treat the methodology, analysis, and the data collected as source information in accordance with Part A, Section 1.4.2.

In the future, re-inventory periods will be more closely aligned to growth and development and successional changes related to specific forest types. This direction recognizes that some forest types change less frequently, in terms of forest stand description attributes, than others, and that some forest types may not need to be re-inventoried every 25 years if they have not been affected by forest operations or natural changes. The reverse of this scenario may also occur in that some productive forest types may require a more frequent re-inventory period that is less than 25 years. More frequent re-inventory periods may be more applicable to forest types that are managed under the selection or shelterwood silvicultural systems, are more susceptible to insect and disease, or that are at different stages in development or succession. Young forest stands or very old forest stands may change and require re-inventory more often than mature free-growing forest stands.

In some cases, the re-inventory period of 25 years may be lengthened to account for differences of five years or more between the date that an FRI was initially provided to the SFL holder (plan holder) and the actual vintage of the information. The re-inventory period must not be lengthened beyond the difference between these two dates. Sustainable forest licence holders (plan holders) who chose to apply the extended re-inventory period must identify their strategy for re-inventory in each forest management plan and must report on the status of their progress in terms of meeting re-inventory requirements based on the extension to the re-inventory period. This status report must be provided in the RPFO. This extension consideration applies only to the first re-inventory cycle. Subsequent re-inventories must be completed on the 25-year cycle, or, as determined from re-inventory strategies for different forest types that are based on growth and yield and changes in succession.

In all other cases, SFL holders (plan holders) must provide a strategy for re-inventorying the productive forest area on licenced Crown lands within a forest management unit when the vintage of the forest stand information reaches 20-years of age at any time within the term of a forest management plan. This strategy will identify the area by forest type that requires re-inventory within the next five years and how the SFL holder (plan holder) intends to carry out the re-inventory process for these areas. This strategy will be documented in the applicable forest management plan and will be incorporated as part of the description of the current forest condition, as described in Section 2.2.2.3 of the FMPM.

Sustainable forest licence holders (plan holders) may investigate and propose alternate re-inventory periods for certain forest types. Sustainable forest licence holders (plan holders) must develop the appropriate rationale from permanent sample plots, growth and yield programs, and other data collection and analysis to support such proposals. The rationale should identify the most appropriate re-inventory period for a given forest type based on stage of development, succession, current and future growth and development trends, and other data and information that can support a proposed change to the re-inventory period.

Sustainable forest licence holders (plan holders) must seek approval from MNR's Director, Forest Management Branch prior to invoking a re-inventory strategy that is greater than 25 years. The strategy for implementing an approved change to the re-inventory period and the rationale to support the change must be documented in the applicable forest management plan as part of the current forest condition, as described in Section 2.2.2.3 of the FMPM. The MNR may enter into arrangements or agreements with SFL holders (plan holders), other forest resource licence holders or third parties regarding the establishment and rationalization of re-inventory periods.

5.1.3.3.3 Verification and Source Information

The MNR may request from SFL holders (plan holders), and must be provided with, access to source information for the purpose of verifying the accuracy of updated information in the forest polygon coverage. In some cases, the MNR may require the provision of specific source data to fulfill their verification roles and responsibilities. The source information may include any information that is used for the purpose of re-inventory, and/or data collected and used to update forest polygon coverage information based on past forest management activities and natural change.

Source data and information may include, but is not limited to:

- Supplementary aerial photography and analysis
- Satellite imagery and analysis
- Permanent sample/growth and yield plots/studies
- GPS – raw data collected
- Company operational inspections or operational surveys/cruises
- Company compliance data

- Other source data collected and used to update the forest polygon coverage information (both spatial and/or tabular attributes)

The MNR will treat the source information which has been made available, or that is provided, by SFL holders (plan holders) for the purpose of verifying the quality of information, in accordance with Part A, Section 1.4.2.

The MNR may also request records and other information related to annual reporting and SEM, or records and other information collected, as part of an exceptions monitoring program in accordance with an approved forest management plan.

5.1.3.3.4 Additional or Different Information

In some cases, SFL holders (plan holders) may maintain and update additional attributes that are not prescribed by the requirements and standards for attribute information in the forest polygon coverage. If SFL holders (plan authors) use additional or different attributes to update their inventories to reflect past management activities or natural change, or to support decisions in a forest management plan, the MNR must be provided access to this additional or different information. The MNR may also determine that SFL holders (plan holders) must submit the different or additional information based on these conditions.

The MNR will consult with the SFL holder (plan holder) to determine the most efficient and cost effective method for access and/or provision of the additional or different information. The MNR and the SFL holder (plan holder) will discuss any limitations on the use of the information with respect to FIPPA legislation. The Minister may also determine that the additional or different information must be treated as confidential information based on this consultation and in accordance with FIPPA.

5.1.3.3.5 Forest Polygon Coverage in Relation to the Stewardship and Planning Inventories

The requirements and standards for the forest polygon coverage, as described in Section 5.1.3, are common to both the stewardship and planning inventories. Some differences in the forest polygon coverage for the stewardship and planning inventory requirements and standards are described in Section 5.2 and Section 5.3. Sustainable forest licence holders (plan holders) must meet the requirements and standards that are specific to each of these inventory requirements in addition to the requirements and standards described in Section 5.1.3.

5.1.3.4 *Timelines for Providing Forest Polygon Coverage*

The forest polygon coverage information must be provided as part of the stewardship and planning inventory information requirements, as described by the timelines in Sections 5.2.4 and 5.3.4 respectively.

5.1.3.5 *Conditions for Providing the Forest Polygon Coverage*

The forest polygon coverage must contain spatial and tabular information in accordance with the requirements and standards prescribed in Section 5.1.3. Spatial and tabular information in the forest polygon coverage must be provided, in digital form, in accordance with the Technical Specifications for Providing Forest Resources Inventory Information.

5.2 Stewardship Inventory

The requirement to produce an updated FRI for the purpose of preparing a forest management plan is described in Part A, Section 1.4 of the FMPM. The requirement for an SFL holder (plan holder) to produce an updated FRI is also described as a condition of an SFL.

The updated FRI provides a description of the current forest cover (current forest condition) and represents a summation of forest management activities and natural changes that occurred to the forest during the previous plan term. It also provides a baseline (background information) for preparing the next forest management plan. This updated FRI is referred to as the stewardship inventory. The requirements, standards, roles and responsibilities, timelines, and conditions for providing information in the stewardship inventory collection are described in this section. These requirements and standards are in addition to those described in Section 5.1.3.

Sustainable forest licence holders (plan holders) are responsible for creating and updating stewardship inventory information for Crown lands on the forest management unit which comprises their licence area. Sustainable forest licence holders (plan holders) are not responsible for FRI information on other lands (i.e., non-Crown areas and Crown land areas excluded from forest management) that are not part of their licenced Crown area.

The MNR must ensure that an inventory of forest resources for non-Crown lands and Crown land exclusions on a forest management unit is provided to SFL holders (plan holders). This inventory must be compatible with the stewardship inventory and must contain sufficient information to meet the requirements for forest management planning. An amalgamation of FRI information for Crown, non-Crown, and Crown land exclusions (if all three areas exist on a unit) is required to form a complete FRI coverage for the entire area of a designated forest management unit for the purpose of preparing a forest management plan.

The stewardship inventory collection contributes to several forest management planning purposes by providing:

a) Updated FRI information based on forest management activities and natural changes which have occurred during the previous plan term

b) A forest stand level record of changes to forest description information based on forest management activities and natural disturbances that have occurred over several successive plan terms

c) Part of the background information used in preparing and/or reviewing the RPFO

d) Background information (depicting the current forest condition) for the initial stages of preparing a planning inventory and support for the initial development of a new forest management plan in accordance with the FMPM

e) A digital record or snapshot of the current forest condition which provides a benchmark of the distribution and composition of forest cover at specific points in time. Successive submissions of the stewardship inventory information will provide time-sequenced records of historic forest condition. The accumulation of this information will allow for the continual assessment of landscape changes over successive forest management plans and provide direct comparisons of the past and current (actual) forest condition with future forest condition as predicted in forest management plans.

f) A direct comparison to annual report information for annual forest management activities and natural changes as they are reflected in updates to forest description information

Some of these purposes may require that a stewardship inventory information product be created. The conditions and process rules for creating a stewardship inventory information product are described in Section 5.2.5. The MNR may also use the stewardship inventory collection for other purposes that involve various analyses of FRI on areas which are broader than a forest management unit (district, habitat ranges, mill woodshed, watershed, eco-regional or provincial basis).

5.2.1 Requirements for the Stewardship Inventory Collection

Sustainable forest licence holders (plan holders) and the MNR must comply with the requirements and standards for updating and maintaining spatial information, inventory base features information, and forest polygon information in accordance with the following sections (respectively):

a) Section 5.1.1 (Datum, Map Projection, and Coordinate System Requirements)

b) Section 5.1.2 (Inventory Base Features Information)

c) Section 5.1.3 (Creation of the Forest Polygon Coverage)

Compliance with the requirements and standards described in these sections will ensure that a stewardship inventory collection containing the most current information is created to support forest management planning.

A forest polygon coverage, in a stewardship inventory collection, must contain spatial and tabular information based on the results of forest management activities and natural changes to the area on a forest management unit. This information must be updated to the end of the last plan term, based on when the stewardship inventory collection is required in accordance with the timelines described in Section 5.2.4.

Sustainable forest licence holders (plan holders) must provide a stewardship inventory collection containing updated information for each of the inventory base feature coverages and the forest polygon coverage. The stewardship inventory collection will also contain the FRI information for non-Crown lands and Crown land exclusions, which has been provided by the MNR.

A stewardship inventory information product is created by assembling individual coverages from the stewardship inventory collection into a composite coverage, according to a set of process rules. A stewardship inventory information product can only be formed using information provided in the stewardship inventory collection in accordance with the technical specifications prescribed by the conditions described in Section 5.2.5. Any other FRI information product, which is created in a different manner than described by these conditions, will not be considered a stewardship inventory information product. Sustainable forest licence holders (plan holders) are not required to provide a stewardship inventory information product.

5.2.1.1 *Inventory Base Feature Information*

The requirements and standards for updating inventory base feature information are described in Section 5.1.2. The MNR must ensure that SFL holders (plan holders) are provided with the most up-to-date inventory base feature information, in accordance with these requirements and standards, six months prior to a licence holder's (plan holder's) timelines to provide a stewardship inventory collection, as described in Section 5.1.2.4.

Sustainable forest licence holders (plan holders) must use the most up-to-date inventory base feature information for creating the forest polygon coverage if the information has been made available at least six months prior to their timelines for providing a stewardship inventory collection. As well, SFL holders (plan holders) must maintain all source data, records, and information, which are used to update/change inventory base feature information.

5.2.1.2 *Forest Polygon Coverage*

The forest polygon coverage must contain updated forest description information that reflects depletions (planned or natural) and natural changes to the forest on Crown lands within a forest management unit, which occurred during the previous planning term. The forest polygon coverage must also contain updated forest description information that reflects the results of renewal and tending activities, for both naturally and artificially regenerated areas, which were conducted on Crown lands during the previous planning term.

The updated information in a forest polygon coverage must be based on actual measurements of data from aerial photography, satellite imagery, silvicultural effectiveness monitoring (SEM) surveys, annual operations inspections, annual report information, and other field surveys or samples. Sustainable forest licence holders (plan holders) must maintain all source data, records, and information which are used to update or change information in the forest polygon coverage.

The MNR will ensure that an FRI for non-Crown lands and Crown land exclusions on a forest management unit is provided to SFL holders (plan holders). The MNR will ensure that the FRI for non-Crown lands and Crown land exclusions provides a complete area coverage based on the area boundaries and definitions maintained in the ownership and land tenure, and the parks and reserves planimetric base features coverage, as described in Sections 5.1.2 and 5.1.3. This FRI must be compatible with the forest polygon coverage and must contain sufficient information to satisfy the requirements for forest management planning on Crown lands.

Sustainable forest licence holders (plan holders) must include the FRI information for non-Crown lands and Crown land exclusions, which is provided by the MNR, as part of the stewardship inventory collection.

5.2.1.3 *Stewardship Inventory Collection*

The following coverages constitute a stewardship inventory collection which must be provided, in digital form, by SFL holders (plan holders) for the Crown area within a forest management unit:

- Water (planimetric base feature coverage)
- Wetlands (planimetric base feature coverage)
- Ownership and Land Tenure (planimetric base feature coverage)
- Parks and Reserves (planimetric base feature coverage)
- Forest Polygon Coverage
- Centre-line Features (individual planimetric base feature coverages):
  - Roads
  - Railways
  - Utility Lines
  - Small rivers, streams and creeks

Section 5.1 describes the requirements of both SFL holders (plan holders) and the MNR to provide updated information in each of these coverages.

Sustainable forest licence holders (plan authors) are required to provide each coverage in the stewardship inventory collection whether or not changes have been made to an individual coverage. If the information has not been changed or updated within a specific coverage, SFL holders (plan holders) are simply required to provide the original, unchanged coverage with submission of their stewardship inventory collection. This will ensure that a stewardship inventory information product can be created by any party using the same source of information and the same process rules in accordance with the conditions described in Section 5.2.5.

Sustainable forest licence holders (plan holders) are not required to provide a stewardship inventory information product. However, in some cases (e.g., for the purposes of preparing an RPFO or for comparing past and present forest conditions), SFL holders (plan authors) and/or the MNR may need to create a stewardship inventory information product. In these cases, the stewardship inventory information product must be created using the information provided by the SFL holder (plan holder) in accordance with this manual, and the process rules described in Section 5.2.5.

Sustainable forest licence holders (plan holders) are also not required to provide hardcopy maps of the stewardship inventory information product to the MNR. If the stewardship inventory information product or equivalent map products are produced, the MNR or SFL holders (plan holders) will assemble the information contained in the stewardship inventory collection in accordance with the conditions described in Section 5.2.5.

An FRI information product, which may be created with other information or different process rules from those outlined in Sections 5.1 and 5.2, will not be considered a stewardship inventory information product, as described by this manual.

5.2.2 Standards for the Stewardship Inventory Collection

The standards for inventory base features information described in Section 5.1.2, and the standards for the forest polygon coverage described in Section 5.1.3 also apply to those same components required as part of the stewardship inventory collection. Sustainable forest licence holders (plan holders) must comply with those standards when creating and providing the stewardship inventory collection.

The primary consideration for the stewardship inventory information standards is related to the vintage of the changed or updated data within the different coverages required in the stewardship inventory collection. Any changes to the inventory base feature coverages or the forest polygon coverage must be recorded based on when the data was changed in each respective layer, as described in Section 5.1.3.

The vintage of the information maintained in a stewardship inventory collection is identified in the forest polygon coverage by the year of update attribute. The year of update for any change data (i.e., any information which has been updated since the last stewardship inventory collection as a result of forest management activities, natural change, or re-inventory) should be applicable to a year within the term of the previous plan. The year of update, for data that has not been changed as a result of forest management activities, natural change, or re-inventory, within the term of the last plan, should remain static. The year of update will be used to assess the vintage of the forest polygon coverage data and is used to determine when productive forest areas require re-inventory.

If forest polygon features (based on size and shape) have changed as a result of updating an inventory base feature (such as water, wetlands, or ownership), but the forest stand description has not, the year of update in the forest polygon coverage should be the same as the year of update in the associated inventory base feature coverage. Any changes to productive forest stands in the forest polygon coverage should be reflected by the year of update as described in Section 5.1.3.2.2. If information in the stewardship inventory collection has changed as a result of forest management activities or natural changes which occurred within the previous plan term, SFL holders (plan holders) must maintain the source data and records which were used to update the applicable coverages in the collection.

5.2.3 Roles and Responsibilities for the Stewardship Inventory Collection

Both the MNR and the SFL holders (plan holders) must archive the information in a stewardship inventory collection, which has been received or provided by either party in accordance with this manual. The original information must be copied before it can be changed or updated. In any discrepancies regarding this information, the SFL holder (plan holder) holds the original stewardship inventory collection information for the forest polygon coverage, and any associated updates/changes they made to inventory base features, for the managed Crown lands on their licensed areas. Similarly, the MNR holds the original FRI information for all other ownerships and Crown land exclusions, and also the unchanged inventory base features information for all lands, on a forest management unit.

5.2.3.1 *Maintaining an Active Forest Resources Inventory*

Stewardship inventory collection information must be provided once every plan term. Between these timeframes, many SFL holders (plan holders) have adopted the practice of maintaining an active FRI for their management unit. An active FRI implies that as changes to the managed Crown area occur as a result of forest management operations or natural changes, FRIs are updated on an annual or more frequent basis.

Maintaining an active FRI reduces the workload required after the end of a plan term to update several years of forest management activities and natural changes to the stewardship inventory collection. Active FRIs which are maintained by SFL holders (plan holders) must not be used to compare, verify, or rationalize the contents of a stewardship inventory collection which has been provided in accordance with this manual.

Sustainable forest licence holders (plan holders) are not required to provide the MNR with annual updates to the stewardship inventory collection.

5.2.3.2 *Updating and Verifying Information in the Stewardship Inventory Collection*

The stewardship inventory collection must contain updates to information based on the results of implementing forest management activities (harvest, access, renewal, tending, maintenance, and protection) and natural changes (natural depletions/disturbances, growth, and succession) to the forest. Sustainable forest licence holders (plan holders) are responsible for updating stewardship inventory collection information (spatial and tabular attributes) for the Crown area on their licences. Information must be updated in accordance with the timelines described in Section 5.2.4.

The MNR will ensure that the most current inventory for Crown lands that has been provided by SFL holders (plan holders) is applied when updating the FRI information for non-Crown lands and Crown land exclusions. MNR will ensure that SFL holders (plan holders) are provided with the best available FRI information for non-Crown lands and Crown land exclusions that exist within their management unit area.

Sustainable forest licence holders (plan holders) must verify that the inventory base features information provided by the MNR is complete and accurate. Sustainable forest licence holders (plan holders) must utilize the inventory base feature information for the purposes of creating a forest polygon coverage and updating information in the stewardship inventory collection. Sustainable forest licence holders (plan holders) must consider the FRI information for non-Crown lands and Crown land exclusions on their licence area when updating information in the stewardship inventory collection.

The MNR must check the accuracy and verify the completeness of the stewardship inventory information provided by SFL holders (plan holders) in accordance with the requirements and standards described in Section 5.2.1 and Section 5.2.2.

5.2.3.3 *Checking the Completeness and Verifying the Accuracy*

The MNR and SFL holders (plan holders) must verify that information provided to them by either party is complete. Checking for completeness includes, but is not limited to, ensuring that:

- the spatial area for each coverage in the stewardship inventory collection is correctly represented in terms of area delineation, correct representation of area and spatial features by theme based on the designated forest management unit area extent, no overlapping areas or holes (sliver management), correct total area, correct map projection and coordinates requirements
- the correct spatial and tabular attributes are contained as required in each coverage as described by the applicable standards
- geographic coverages are compatible with no overlapping polygons, proper use of coincident or contiguous lines (no dangles), and the same geo-referenced map extents based on a forest management unit boundary

- the digital formats are correct in accordance with the conditions and technical specifications

The MNR must also verify the stewardship inventory information for accuracy. Considerations when verifying for accuracy include, but are not limited to, ensuring that:

- the spatial and tabular information has been updated correctly, based on forest management activities and natural changes to Crown areas that occurred during the previous plan term
- updates to the inventory base feature information are consistent with the applicable updates to the forest polygon coverage
- the appropriate inventory base feature information was applied
- updates adequately reflect the current forest condition
- the vintage of the information is correctly applied and falls within the requirements for the re-inventory period
- polygon identification is unique, based on the mapsheet or coverage extent
- the information meets the requirements and standards described in this manual

Checking of the stewardship inventory collection information for completeness and verifying for accuracy should normally occur within 60 working days of receiving the stewardship inventory information. Within these 60 working days, the receiving party must notify the other party that the information has been checked for completeness and verified for accuracy and whether the information meets the requirements prescribed by this manual. If the checking and verification process requires an extension due to errors or inconsistency in the information provided, the receiving party must notify the provider concerning the nature of the discrepancy and the time required to complete the verification process.

If the information does not meet the requirements described by this manual, the receiving party must provide a description of the errors or the reasons why the stewardship inventory collection information does not meet the requirements. The two parties must determine the extent of the corrections required and the earliest timeframe in which the required revisions to the affected stewardship inventory information should be resubmitted.

Sustainable forest licence holders (plan holders) are not required to submit a stewardship inventory information product. If the requirements and standards for the inventory base feature information and forest polygon coverage information are met in accordance with this manual, the creation of the stewardship inventory information product becomes a standardized (automated) process, as described in Section 5.2.5. Sustainable forest licence holders (plan holders) and the MNR will be able to assemble and create identical stewardship inventory information products by following the conditions described in Section 5.2.5 and the process rules described in the technical specifications.

5.2.3.4 *Source Data and Records*

The MNR may require access to, or provision of, the source data, records, and information from SFL holders (plan holders) which they used to create or update the stewardship inventory collection. The MNR may make such requests for access to, or provision of, source data, records, and information for the purpose of checking the completeness or verifying the accuracy of stewardship inventory information which has been provided by SFL holders (plan holders). The MNR will respect the intellectual property rights of the SFL holders (plan holders) in using the source data, records, and information for these purposes. The source data, records, and information will be treated in accordance with Part A. Sections 1.2 and 1.4.

5.2.4 Timelines for the Stewardship Inventory Collection

Sustainable forest licence holders (plan holders) must provide a stewardship inventory collection once during the term of a forest management plan. A digital stewardship inventory collection is required one year after the end of a forest management plan term and must contain updated information based on the results of forest management activities and natural changes that occurred on the forest management unit in the previous plan term.

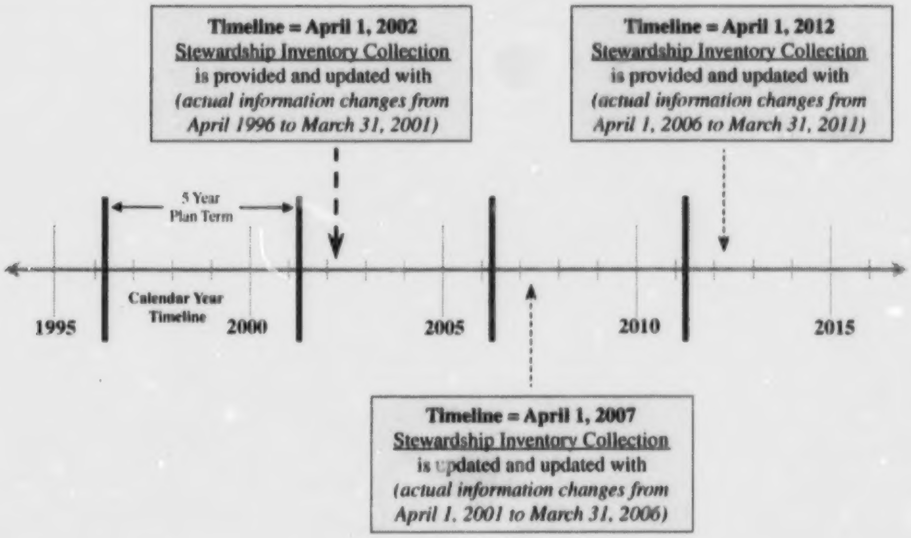
For example, if a plan term ended on March 31, 2001, an updated stewardship inventory must be provided to the MNR by April 1, 2002. This inventory must contain updates to information based on the results of implementing forest management activities (harvest, access, renewal, tending, maintenance, and protection) and natural changes (natural depletions, growth, and succession) to the forest up to and including March 31, 2001 (the end of the plan term). This example is shown in Figure B-12, which identifies three consecutive plan terms: April 1, 1996 – March 31, 2001; April 1, 2001 – March 31, 2006; and April 1, 2006 – March 31, 2011.

The MNR must ensure that an up-to-date inventory of forest resources, for non-Crown lands and Crown land exclusions, is provided to SFL holders (plan holders) six months prior to their requirement to provide a stewardship inventory collection.

5.2.4.1 *First Date of Effect for Stewardship Inventory Collection Requirements*

The first date of effect that a stewardship inventory collection must be provided by an SFL holder (plan author) in accordance with this manual is April 1, 2002. Sustainable forest licence holders (plan holders) that have a forest management plan with a term that ends on March 31, 2001, are required to create and provide a stewardship inventory collection in accordance with this manual.

Figure B-12 An example of the timeline requirements for a stewardship inventory collection based on a five-year forest management plan term.



Timeline = April 1, 2002
Stewardship Inventory Collection
is provided and updated with
(actual information changes from April 1996 to March 31, 2001)

Timeline = April 1, 2012
Stewardship Inventory Collection
is provided and updated with
(actual information changes from April 1, 2006 to March 31, 2011)

Timeline = April 1, 2007
Stewardship Inventory Collection
is updated and updated with
(actual information changes from April 1, 2001 to March 31, 2006)

To meet the first date of effect for provision of a stewardship inventory collection, the MNR must ensure that SFL holders (plan holders) are provided with inventory base feature information and an FRI for non-Crown lands and Crown exclusions by October 1, 2001.

The requirements to provide updated information in a stewardship inventory collection, based on the first date of effect, may vary depending on the following considerations:

- the date of transfer of FRI responsibilities to new SFLs which were established between 1996 and 2001
- whether new SFL holders (plan holders) had a digital FRI in place during the previous plan term (April 1, 1996 to March 31, 2001)
- the tabular attribute information required in the forest polygon coverage

Transfer of Inventory Responsibilities and Availability of Digital Inventory

For new SFLs established between 1996 and 2001, the timeline requirements for providing an updated stewardship inventory collection must be based on when the responsibilities for the FRI were transferred to the new licensee. This date may be further modified based on when the digital inventory was officially provided to the new SFL holder by the MNR. Sustainable forest licence holders (plan holders) are required to provide updated information in a stewardship inventory collection based on when they assumed the responsibilities and possessed a digital FRI.

For example, if an SFL holder (plan holder), whose plan term ends on March 31, 2001, did not have a digital FRI until 1998, then the licence holder (plan holder) is only required to provide updates starting in 1997 for fiscal years 1997/1998, 1998/1999, 1999/2000, and 2000/2001. The new digital inventory received by the SFL holder (plan holder) in 1998 would normally have included updates from forest management activities and natural changes that occurred on the management unit up to, and including, the 1996/97 fiscal year. This type of consideration and direction applies to all information required in a stewardship inventory collection.

Tabular Attributes Required in the Forest Polygon Coverage

The other consideration is based on the type of information required as part of the stewardship inventory collection. All spatial information in the stewardship inventory collection must be updated in accordance with this manual and in accordance with the timelines described in this section. The tabular attributes in the forest polygon coverage are designated as either enhanced conversion attributes, enhanced transitional attributes, or non-transitional attributes as described in Section 5.1.3.2.6.

Sustainable forest licence holders (plan holders) are required to provide the enhanced conversion attribute information for all productive forest areas on Crown lands in accordance with Section 5.1.3.2.6. The actual information for each of the enhanced conversion attributes must be provided in a forest polygon coverage for those productive forest areas which were affected by forest management activities and natural changes during the previous plan term. The date on which a digital FRI was provided to an SFL holder (plan holder), based on the considerations described above, may also impact the number of years within the previous plan term that require actual information for these attributes.

Sustainable forest licence holders (plan holders) whose plan term ends on March 31, 2001 are not required to provide information for any of the enhanced transitional attributes as described in Section 5.1.3.2.6. Sustainable forest licence holders (plan holders) whose plan term ends on March 31, 2002 are required to provide enhanced transitional attribute information for one fiscal year of management activities or natural changes which occurred since the date of implementation of this manual. Subsequent plan terms must sequentially add each year of enhanced transitional attribute information. The enhanced transitional attributes will be required for the entire term starting with plans which end on March 31, 2006 (due April 1, 2007) and beyond.

Sustainable forest licence holders (plan holders) are required to provide updated information for all the non-transitional attributes as described in Section 5.1.3.2.6 for productive areas which have been affected by forest management activities and natural changes in the previous plan term. The availability of a digital FRI may also impact the number of years within the previous plan term which require actual information for these attributes as described by the considerations in this section.

Sustainable forest licence holders (plan holders) who are required to meet this first date of effect may have commenced with updating their FRI information prior to the implementation of this manual. The MNR must consider all updates that SFL holders (plan holders) have made prior to the implementation of this manual. Sustainable forest licence holders (plan holders) must provide their FRI information in accordance with the standards described by this manual.

The MNR may enter into arrangements or agreements with SFL holders (plan holders) and other third parties for the purpose of creating stewardship inventory collection information in accordance with this manual for inventories required on April 1, 2002.

5.2.4.2 *Confirmation of Stewardship Inventory Information*

The MNR must check the completeness and verify the accuracy of the stewardship inventory collection information provided by SFL holders (plan holders) normally within 60 working days of receiving the information, as described in Section 5.2.3. Within the 60 working day period, the MNR will provide the SFL holder (plan holder) with a confirmation of acceptance of the information or a notification that the information was not accepted. A notification of non-acceptance will include a description of the information which requires revisions. The MNR will determine the time required to make the revisions based on consultation with the affected SFL (holder) plan holder.

5.2.5 Conditions for the Stewardship Inventory Collection and Information Product

Sustainable forest licence holders (plan holders) must provide the MNR with a stewardship inventory collection in the digital format, as described in the *Technical Specifications for Providing the Stewardship Inventory Collection Information.*

The MNR must ensure that SFL holders (plan holders) are provided with an inventory of forest resources for non-Crown lands and Crown land exclusions for their licence area that is compatible and consistent with the *Technical Specifications for Providing the Stewardship Inventory Collection Information.*

The technical specifications may describe the following details related to providing digital information required in the stewardship collection or related to preparing a stewardship inventory information product:

- specifications required to provide all stewardship inventory collection information in a standardized and convenient digital format
- detailed data standards relating to change-data or quality control measures for ensuring the quality of data for each of the individual coverages in a stewardship inventory collection
- process rules and detailed data standards for modifying inventory base feature information and assembling the revised base features into a forest polygon coverage, as described in Section 5.1.3

- process rules for buffering centre-line features, creating polygons from linear features, and adding polygons to the forest polygon coverage
- process rules for creating a stewardship inventory information product using the individual coverages in a stewardship inventory collection

The MNR and SFL holders (plan holders) must comply with the technical specifications when preparing a stewardship inventory information product. Section 5.2.5.1 briefly describes the process for adding linear base features to the forest polygon coverage for the purpose of creating a stewardship inventory information product.

5.2.5.1 *Adding Linear Features to the Forest Polygon Coverage*

A stewardship inventory information product serves several purposes as described in Section 5.2.1. The individual coverages contained in a stewardship inventory collection are not normally used by themselves, but are combined to portray a more accurate representation of area when assembled into a stewardship inventory information product. One of the most important steps in creating a stewardship inventory information product involves the addition of buffered, centre-line features (newly formed polygons) onto a copy of the forest polygon coverage. The process of adding polygons (buffered linear features) to a copy of the forest polygon coverage involves the reduction in area from the original polygons based on removing the area occupied by the newly added polygons which were created from buffering.

As described in Section 5.1.2 there are four planimetric base feature coverages which contain linear features:

a) Roads
b) Railways
c) Utility lines
d) Small rivers, streams and creeks

The spatial information maintained in each of these planimetric base feature coverages represents the centre line of each linear feature within a coverage. As such, these features have no area and are not maintained as part of the forest polygon coverage. Section 5.1.2 describes the requirements and standards for SFL holders (plan holders) and the MNR to update, maintain, and provide linear base features information.

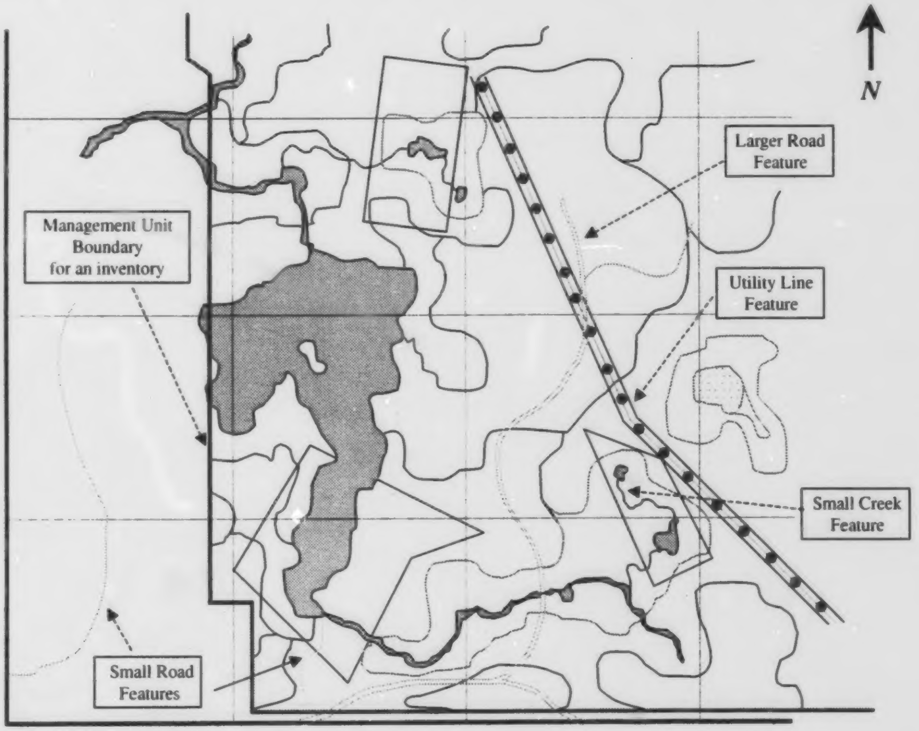
Some linear features, such as provincial highways or railways, have relatively fixed corridor widths associated with their features. In order to correctly represent and portray these types of features in an FRI, buffer widths must be assigned to the appropriate centre-line features to assist in the calculation of area that will approximate the true area occupied by the feature. Other linear features, such as small streams and creeks which occupy very little area, may not require buffering, in which case their centre-lines are geo-referenced directly onto a stewardship inventory information product.

The technical specifications provide standardized rules for applying buffer-widths to different types of linear features. These buffer rules must be applied to linear features when creating a stewardship inventory information product. The buffer rules ensure that linear features, that have similar physical characteristics in terms of type, width and area are portrayed in a consistent fashion for the purpose of creating a stewardship inventory information product or other FRI information products.

Figure B-13 shows an example of a completed stewardship inventory information product which has been created by adding buffered linear features (polygons), according to the technical specifications, to a copy of the forest polygon coverage.

In some cases, the actual corridors may already have been captured in the forest polygon coverage. Therefore, buffering of linear features from the linear feature coverages within corridors may not be required. In other cases, corridors may be embedded as part of unclassified land polygon types as described in Section 5.1.3.2.2.

Figure B-13 An illustration of a stewardship inventory which has been created by adding buffered, linear base features from the applicable centre-line base feature coverages to a copy of the forest polygon coverage.



The technical specifications may also describe process rules for determining how road corridors can be identified within unclassified land polygon types, which are irregular in shape, or for buffering linear features within unclassified land polygons. The buffer rules and the process for adding polygons, which have been created from linear features, to the forest polygon coverage for the purpose of creating a stewardship inventory information product are described in the *Technical Specifications for Providing the Stewardship Inventory Collection.*

5.3 Planning Inventory

The planning inventory is used as a basis to prepare and monitor the development of a forest management plan and to support decisions made in an approved plan. The planning inventory is created from the stewardship inventory collection and provides a foundation for creating the Planning Database as described in Section 2.0. The planning inventory provides the source data for preparation of forest management plan area summary tables (FMP-1, FMP-2, FMP-8, and FMP-9), partial preparation of several other FMP tables and a basis for preparing annual report spatial and tabular information. The planning inventory also provides the basic information required for forest modelling, habitat modelling, and landscape diversity analyses, as described in Section 6.0 and which are applied during the strategic and operational planning stages of developing a forest management plan.

A planning inventory is prepared for each forest management plan and remains with the plan from its initial preparation to its implementation and subsequent evaluation. The timeframe for a planning inventory extends from 27 months prior to the start of the plan (for plan development) to two years after the end of the plan term (for preparation of the RPFO). Consequently, the normal period of use for a planning inventory with a five-year plan term extends for a period of approximately nine years. The usefulness of the planning inventory may extend beyond this period since it is stored (archived) with the forest management plan and may provide relevant background information when referencing and assessing past plans (i.e. RPFO).

Similar to the stewardship inventory, the planning inventory contains updated forest description information from forest management activities and natural changes to the forest. The planning inventory also contains forecasted changes to forest description information based on the expected outcomes from planned operations which have not yet been implemented from the currently approved forest management plan. The forest description component of the planning inventory may also be projected (grown) to the start date of the new forest management plan that is being developed.

5.3.1 Requirements for the Planning Inventory

The requirements for providing planning inventory information are directly related to specific stages in the development of a forest management plan.

5.3.1.1 *Components of the Planning Inventory*

Sustainable forest licence holders (plan holders) are required to create and provide four types of information as part of the planning inventory:

- **a)** A planning inventory collection containing updated and change information for each individual coverage in the collection (i.e., inventory base features coverages and forest polygon coverage)
- **b)** A composite planning inventory information product which must be created from the updated coverages in the planning inventory collection
- **c)** A summary of forest level management decision information (tabular attributes only), which are tracked at the stand level
- **d)** A set of planning coverages which identify planned harvest areas and AOC reserves for the new plan, and road use strategy and corridors for planned road construction for the remainder of the current plan term and for the new plan term

These different types of information are collectively referred to as the planning inventory. These components are listed in the order in which information must be updated or created. Before the requirements to create a composite planning inventory information product can be met, the individual coverages within the planning inventory collection (inventory base features coverages and forest polygon coverage) must be updated. The composite planning inventory information product is then created from the updated planning inventory collection. Management decision information is appended to the planning inventory information product later in the planning process.

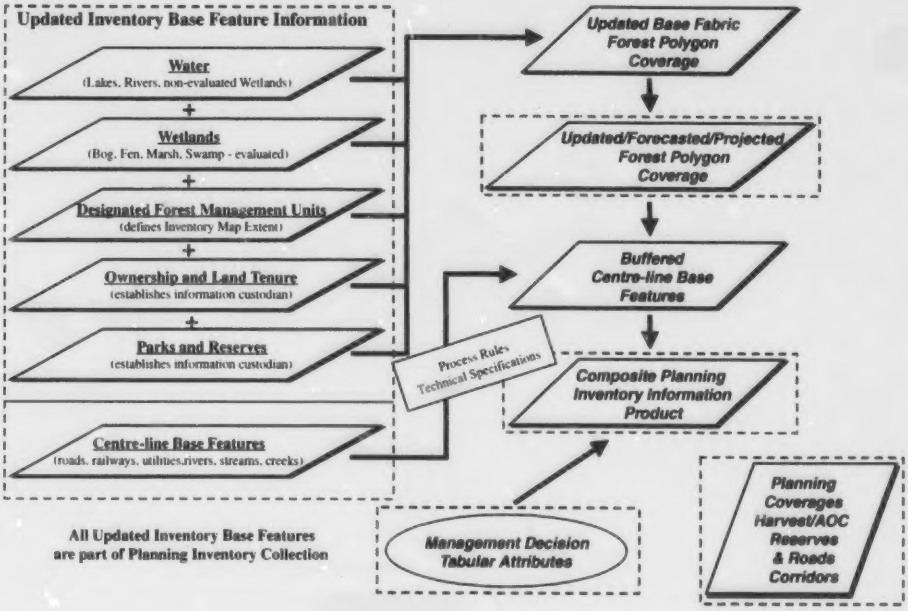
The composite planning inventory information product does not include the planning coverages, which are separate planning inventory requirements. Figure B-14 illustrates the components of a planning inventory and the sequence of events from the initial update of the inventory base features coverage and forest polygon coverage, to the assembly of a composite planning inventory information product and the creation of a set of planning coverages.

The dashed rectangles indicate the information which must be provided by SFL holders (plan holders) in accordance with the requirements described in Section 5.3.1.

5.3.1.2 *Preparation of the Planning Inventory*

Planning teams normally update their FRIs several months prior to starting the 27-month forest management planning process. The process to update an FRI begins with the most recent stewardship inventory collection that has either been maintained as an active inventory (usually on an annual basis) or that was last produced in accordance with Section 5.2. In relation to the start of a new forest management planning process, the most recent stewardship inventory collection would be approximately two to three years out of date.

Figure B-14 Development of a planning inventory collection, a composite planning inventory information product, management decision information, and planning coverages.

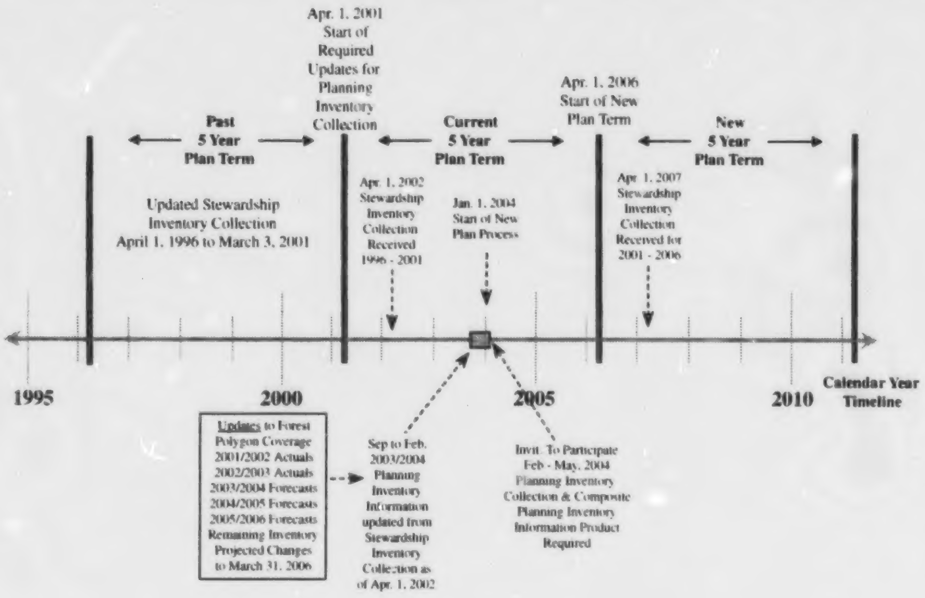

Updated Inventory Base Feature Information
Water
(Lakes, Rivers, non-evaluated Wetlands)
+
Wetlands
(Bog, Fen, Marsh, Swamp - evaluated)
+
Designated Forest Management Units
(defines Inventory Map Extent)
+
Ownership and Land Tenure
(establishes information custodian)
+
Parks and Reserves
(establishes information custodian)
Centre-line Base Features
(roads, railways, utilities,rivers, streams, creeks)
All Updated Inventory Base Features are part of Planning Inventory Collection
Updated Base Fabric Forest Polygon Coverage
Updated/Forecasted/Projected Forest Polygon Coverage
Buffered Centre-line Base Features
Process Rules Technical Specifications
Composite Planning Inventory Information Product
Management Decision Tabular Attributes
Planning Coverages Harvest/AOC Reserves & Roads Corridors

The development of the planning inventory collection, normally includes the following steps:

- updating inventory base feature coverages provided by the MNR.
- assembling/updating a forest polygon base coverage using the most recent stewardship inventory collection information and the inventory of forest resources for non-Crown lands and Crown land exclusions.
- adding two years of updates to forest polygon coverage based on forest management activities and natural changes which occurred during the first two years of the currently approved plan.
- adding three years of forecasted changes to the forest polygon coverage based on planned forest operations for the remaining term of the currently approved plan
- adding changes to forest stand descriptions in the forest polygon coverage based on growth projections to the start of the new plan term.

Figure B-15 illustrates this process based on a five-year plan term. In this example, the start of the next five-year plan term is April 1, 2006 and the forest management plan development process would consequently be initiated on January 1, 2004. Therefore, FRI updates would likely begin about September, 2003. The most recent stewardship inventory collection (forest polygon coverage) would have been produced on March 31, 2002 and would contain information updated to March 31,

Figure B-15 The transition from a stewardship inventory collection updated from the previous plan term to a planning inventory collection prepared for the new plan term.


Apr. 1, 2001
Start of
Required
Updates for
Planning
Inventory
Collection
Past
5 Year
Plan Term
Updated Stewardship
Inventory Collection
April 1, 1996 to March 3, 2001
Current
5 Year
Plan Term
Apr. 1, 2002
Stewardship
Inventory
Collection
Received
1996 - 2001
Jan. 1, 2004
Start of New
Plan Process
Apr. 1, 2006
Start of New
Plan Term
New
5 Year
Plan Term
Apr. 1, 2007
Stewardship
Inventory
Collection
Received for
2001 - 2006
1995
2000
2005
2010
Calendar Year
Timeline
Updates to Forest
Polygon Coverage
2001/2002 Actuals
2002/2003 Actuals
2003/2004 Forecasts
2004/2005 Forecasts
2005/2006 Forecasts
Remaining Inventory
Projected Changes
to March 31, 2006
Sep to Feb.
2003/2004
Planning
Inventory
Information
updated from
Stewardship
Inventory
Collection as
of Apr. 1, 2002
Invit. To Participate
Feb - May, 2004
Planning Inventory
Collection & Composite
Planning Inventory
Information Product
Required

2001. In this example, SFL holders (plan authors) would use the stewardship inventory collection information produced on March 31, 2001 and add two years of updates to reflect the results from forest management activities and natural changes that occurred during the 2001/2002 and the 2002/2003 fiscal years.

The MNR will ensure that SFL holders (plan holders) are provided with the best available inventory base feature information for all lands on a forest management unit area and an FRI for the non-Crown lands and Crown land exclusions on the area. The MNR will ensure that this information is provided to SFL holders (plan holders) six months prior to the start of a new forest management plan process, as described by the timelines in Section 5.3.4.

The following sections describe the requirements for the planning inventory components as described in Section 5.3.1.1.

5.3.1.3 *Requirements for the Planning Inventory Collection*

The MNR must provide SFL holders (plan holders) with inventory base features coverages as well as an inventory of forest resources for non-Crown lands and Crown land exclusions, as described in Sections 5.1.2 and 5.1.3. SFL holders (plan holders) must utilize this information when creating or updating planning inventory collection information (primarily the forest polygon coverage).

Sustainable forest licence holders (plan holders) must provide a planning inventory collection at the Invitation to Participate stage in the forest management plan development process as described by the timelines in Section 5.3.4. The planning inventory collection contains only those inventory base feature coverages in which information has changed since it was provided by the MNR, and must contain an updated forest polygon coverage. Sustainable forest licence holders (plan holders) are not required to submit information for individual coverages in the planning inventory collection where information has not changed (with the exception of the forest polygon coverage).

Sustainable forest licence holders (plan holders) are required to update inventory base feature information for base features which they have encountered during the implementation of forest management operations since the start of the current plan term, as described in Section 5.1.2. Any change to the inventory base feature information coverages in the planning inventory collection automatically requires a corresponding change to the forest polygon coverage. For the purposes of updating the planning inventory collection, the MNR will accept the updated inventory base features information provided by the SFL holder (plan holder).

Sustainable forest licence holders (plan holders) must also provide an updated roads centre-line coverage for the licenced Crown areas within a designated forest management unit. As well, they must provide information for Crown forest access roads which they constructed during the first two years of the currently approved plan term. The MNR will ensure that updates to the roads centre-line base feature coverage are provided to SFL holders (plan holders) for Crown forest access roads which are not the responsibility of the SFL holder (plan holder).

If any significant changes to the individual coverages in the planning inventory collection have been made after the collection information was submitted at the Invitation to Participate stage and prior to the submission of the final plan, SFL holders (plan holders) must provide the updated coverages within the planning inventory collection. These updates are required with the revised plan and will be archived with the approved forest management plan.

5.3.1.3.1 Inventory Base Features Component

The requirements for inventory base features information in the planning inventory collection are the same as for the stewardship inventory collection as described in Section 5.1.2.

The MNR will ensure that SFL holders (plan holders) are provided with access to the most up-to-date inventory base features information in accordance with the timelines described in Section 5.3.4. Sustainable forest licence holders (plan holders) are required to provide updates to certain inventory base features as they encounter new features or incorrect information about existing features during the implementation of forest management operations.

Updates to inventory base feature information will normally occur prior to the start of a new forest management planning process but may occur up to the initiation of the Invitation to Participate stage. Inventory base feature information must be updated to reflect changes that have occurred since the beginning of the current plan term. Updates to inventory base feature information must also be incorporated into the forest polygon coverage.

Sustainable forest licence holders (plan holders) are required to update the roads centre-line base feature coverage with any new Crown forest access roads which they have constructed since the beginning of the current plan term. Updates to the roads centre-line base feature coverage must be completed in accordance with Section 5.1.2.

5.3.1.3.2 Forest Polygon Coverage Component

Sustainable forest licence holders (plan holders) must provide an updated forest polygon coverage as part of the planning inventory collection. Sustainable forest licence holders (plan holders) are only required to maintain updates, forecasts, and projections that affect the forest polygon coverage for licenced Crown areas on a forest management unit.

The MNR must ensure that SFL holders (plan authors) are provided with FRI information in accordance with Section 5.1.3 for non-Crown areas and Crown land exclusions within a designated forest management unit prior to the start of the forest management planning process. Sustainable forest licence holders (plan authors) are required to incorporate this FRI information with the forest polygon coverage for the licenced Crown area. Sustainable forest licence holders (plan holders) must update information in the forest polygon coverage for the Crown area on a forest management unit prior to creating the composite planning inventory information product.

The information required in a forest polygon coverage for a planning inventory must have the same spatial and tabular attributes as described by the requirements in Section 5.1.3. The most significant difference between the forest polygon coverage in a stewardship inventory collection and in a planning inventory collection is that some of the forest stand description information in the planning inventory are forecasted or projected (grown). Forecasted or projected information does not reflect changes based on actual data measurements (inspections, surveys, aerial photography, etc.). Whereas the forest polygon coverage information in a stewardship inventory collection does not contain forecasted or projected changes from planned operations or updates, it reflects updated information based only on the actual activities and natural changes that have occurred.

The forest polygon coverage in a planning inventory collection requires three different considerations and timeframes for updating information: actual updates, forecasted changes, and projected changes. This sequence of update considerations is required to bring the forest polygon coverage information forward in time to represent conditions at the start date of the new forest management plan term.

Actual Updates

The forest polygon coverage from the most recent stewardship inventory collection provides a starting point for updating information for the purpose of creating a planning inventory collection. Forest stand description information must be updated for those productive forest areas which have been affected by forest management activities and natural changes which occurred since the start of the currently approved forest management plan (normally the last two fiscal years).

Forecasted Changes

In the next step, SFL holders (plan holders) are required to update the forest description information for those forest stands that are scheduled and/or planned for forest management operations for the current fiscal year and the last two fiscal years of the currently approved forest management plan term. The changes to the forest description information represent forecasts of how forest stands are expected to change as a result of implementing the scheduled or planned forest operations in the remaining part of the current plan term.

Projected Changes

The final step in updating the forest polygon coverage requires that SFL holders (plan holders) consider projected changes to productive forest areas to bring the forest stand description attributes up to the start date of the new forest management plan term. Where appropriate, forest stand description information may be grown or adjusted for productive forest stands. All age-related information (determination of age or age class), and corresponding forest description information, must be relevant to the start date of the new forest management plan term. Projection algorithms may be used, subsequent to MNR approval, to make adjustments to some forest description information such as height.

The actual updates, forecasted changes, and projected changes must be completed prior to the invitation to participate stage in the forest management planning process. Sustainable forest licence holders (plan holders) must provide the appropriate MNR district planning team with an updated forest polygon coverage as part of the planning inventory collection information at the Invitation to Participate stage.

5.3.1.4 *Requirements for the Composite Planning Inventory Information Product*

Sustainable forest licence holders (plan holders) are required to create and provide a composite planning inventory information product from the updated base features information and the updated forest polygon coverage. The composite planning inventory information product must be provided along with the planning inventory collection at the invitation to participate stage in the forest management planning process as described by the timelines in Section 5.3.4. If any significant change occurs to any of the individual coverages in the planning inventory collection during plan development which affect the composite planning inventory information product that was submitted at the invitation to participate stage, then a copy of the revised information must be provided with submission of the final plan.

Sustainable forest licence holders (plan holders) must use the updated centre-line base features information to create polygons which are used to refine the forest polygon coverage information in terms of the actual area occupied by linear features such as roads, railways, utility lines, and small river, streams, and creeks. Sustainable forest licence holders (plan holders) must apply process rules for the purpose of adding linear features to the updated forest polygon coverage in accordance with the technical specifications as described by the conditions in Section 5.3.5. The technical specifications describe the process rules for buffering different centre-line features based on corridor width, creating polygons from the buffering process, adding the polygons to a copy of the forest polygon coverage and then adjusting the affected areas. The areas of forest polygon features are adjusted to reflect the addition of buffered linear features such that there is no net loss or gain in area on the forest management unit. The addition of buffered linear features provides a better approximation of the actual forested and non-forested area in a forest management unit.

The end result of this process is the creation of a composite planning inventory information product which contains updated information that is current to the start date of the new forest management plan term.

5.3.1.5 *Requirements for the Management Decision Information*

The purpose of creating and maintaining management decision information is to track key forest level decisions that support the amalgamation and the availability of forest stands for forest management planning purposes at the stand level. This information also provides the basis for determining available harvest area, supports the selection of areas which are eligible for harvest and renewal, and also provides an indication of how stands within a forest unit will be managed during the term of a new forest management plan. The management decision information represents a very small subset of the forest level management decisions that made in a forest management plan.

The requirements for management decision information apply only to the licenced Crown area on a forest management unit and, therefore, apply to SFL holders (plan holders). The management decision attributes apply only to the productive forest areas. All water, non-forested, and non-productive forest lands are considered as unavailable for the purpose of forest management planning and are not included as part of the managed Crown forest area for determining the available harvest area by forest unit and, therefore, do not require management decision information.

The management decision information consists of a set of tabular attributes which must be maintained on a stand by stand basis. All management decision information must be related to the polygon identification information contained in the composite planning inventory information product. This ensures that management decision information can be directly appended to the appropriate productive forest polygon records in the composite planning inventory information product. Sustainable forest licence holders (plan holders) must provide the following management decision attributes which can be directly appended to the composite planning inventory information product:

Polygon Identification
Sub Management Unit
Forest Unit
Age
Availability Indicator
Silvicultural System
Stage of Management
Silvicultural Intensity

The polygon identification includes the attributes of Forest Management Unit Number, Mapsheet Number, and Polygon Number which are described in Section 5.1.3.2.2. The polygon identification information must relate directly to the polygon identification information maintained in the composite planning inventory information product

Management decision attributes, such as sub management unit, forest unit, age, availability indicator, silvicultural system, and stage of management must be completed for every productive forest stand on the licenced Crown lands within a designated forest management unit. The silvicultural intensity attribute is only required for forest stands that have been managed (depleted, renewed) in past forest management plans or that are allocated in the term of the new plan. The silvicultural intensity should be consistent with the stage of development attribute in the forest polygon coverage and the stage of management (management decision attribute). The standards for creating and updating the management decision attributes are described in Section 5.3.2.

Sustainable forest licence holders (plan holders) must provide the management decision information, with the exception of the silvicultural intensity attribute, when the notice of the First Information Centre is issued, as described by the timelines in Section 5.3.4. The silvicultural intensity information is required with submission of the draft plan.

5.3.1.6 *Requirement for the Planning Coverages*

The following planning coverages must be created and provided as part of the planning inventory information product:

a) Planned Harvest and AOC Reserve Areas
b) Road Use Strategy for Existing Roads
c) Road Corridor Locations for Planned Road Construction

Sustainable forest licence holders (plan holders) must provide the planning coverages at the draft plan submission stage as described by the timelines in Section 5.3.4. The planning coverages are not incorporated as part of the composite planning inventory information product. However, they must be spatially compatible, such that the planning coverages can be overlaid and spatially linked to the composite planning inventory information product. The planning coverages contain both spatial and tabular information and must be provided in digital format in accordance with the conditions described in Section 5.3.5.

Planned Harvest and AOC Reserve Areas Coverage

The planned harvest and AOC reserve areas coverage contains the planned harvest areas and the planned AOC reserve areas which have been selected for the term of the new plan. Only those areas (identified by forest stands) from the composite planning inventory information product that are selected as harvest and reserve areas need to be included as part of this coverage. This coverage will also contain the polygon identifications (see Section 5.1.3.2.2) for all forest stands that have been selected for harvest and reserve depletions, as described in Section 2.4.4.1 of the FMPM.

Harvest Areas

The harvest area for the term of a new forest management plan must identify the area for each forest stand that has been proposed for harvest operations. The harvest area must be separated into the planned harvest area and surplus harvest area on a stand by stand basis. The sum of the planned and surplus harvest areas must equal the total forecasted harvest area by forest unit, age class, and stage of management. This coverage contains the polygon identification for the forest stands which are selected as planned harvest areas and surplus harvest areas in the new plan term.

Reserve Areas

Reserve areas are parts of areas (stands) which were initially selected for harvest, but were subsequently removed from the selected harvest areas as a result of AOC planning. The reserve area must identify those areas on a stand by stand basis which are associated with the harvest areas where no harvest operations or restricted harvest operations are permitted. The polygon identification for the forest stands which are designated as harvest reserves for the new plan term must also be provided as part of the planned harvest and AOC reserve areas coverage.

Road Use Strategy for Existing Roads Coverage

This coverage identifies Crown forest access roads which will; no longer be maintained, remain active, be upgraded, be abandoned or have restricted access. This road access restriction and maintenance information applies to the remainder of the current plan term and for the term of the new plan. The information contained in this coverage should be consistent with the roads use management strategy and operational planning sections of the new forest management plan. This coverage utilizes the updated roads centre-line coverage as its base fabric.

Road Corridor Locations for Planned Road Construction Coverage

This coverage contains primary and secondary Crown forest access road corridors in which roads are planned for construction during the remaining term of the current plan and the for the term of the new plan. This coverage must consist of polygons that depict a road corridor width of 500 metres for both primary and secondary forest access road corridors, as described in Section 2.4.5 of the FMPM. Forecasts of primary and secondary roads which traverse AOCs must be identified as 100 metre corridors (polygons) in this coverage.

5.3.1.7 *Requirements for Other Information to Support the Development of the Planning Inventory*

The planning inventory may contain other planimetric base features, such as lots and concessions or township boundaries, which assist plan readers in locating and providing an alternate reference to forest stand polygons and proposed areas of operations. Likewise, other planimetric base feature coverages such as the Digital Terrain Model (DTM), vegetation, ecoregions, ecodistricts, etc., may be required to support different information products required in the planning database or to support the analysis of management alternatives which is carried out during the development of a forest management plan. The MNR must provide SFL holders (plan holders) with these other planimetric base feature coverages, as required. The requirements for other planimetric base features information are described in Section 3.0 of the FIM.

5.3.2 Standards for the Planning Inventory

The standards (spatial and tabular) for the planning inventory collection information, with regard to updating inventory base features information and creating an updated forest polygon coverage, are essentially the same as for the stewardship inventory collection, for the information they have in common. The spatial and tabular standards for inventory base feature information and forest polygon coverage information are described in Sections 5.1.2 and 5.1.3, respectively.

The planning inventory information has some additional standards for centre-line base feature information, management decision information, and the planning coverages.

5.3.2.1 *Standards for Inventory Base Feature Information*

Sustainable forest licence holders (plan holders) must use the inventory base features information provided by the MNR to create an updated inventory base fabric for the forest polygon coverage. Sustainable forest licence holders (plan holders) are required to update the spatial and tabular inventory base features information in accordance with the standards in Section 5.1.2 for those features which they encounter during the implementation of forest management operations.

The standards required to assemble an updated inventory base feature fabric for the purpose of creating the forest polygon coverage are described in Section 5.1.3.

Sustainable forest licence holders (plan holders) are required to update information for forest access roads, within the roads centre-line base feature coverage, on Crown lands within their licenced area in accordance with the requirements and standards described in Section 5.1.2. Sustainable forest licence holders (plan holders) must update forest access roads information for roads which have been constructed during the first two years of the currently-approved forest management plan. The roads centre-line base feature coverage must be updated prior to creating a composite planning inventory information product and the planning coverages.

The MNR will ensure that centre-line base features information is provided to sustainable forest licence holders (plan holders) in accordance with the standards described in Section 5.1.2.

5.3.2.2 *Standards for Forest Polygon Coverage Information*

The standards for updating the forest polygon coverage information (spatial and tabular), for the purpose of creating the planning inventory collection, are described in Section 5.1.3. Sustainable forest licence holders (plan holders) must use the forest polygon coverage from the most recent stewardship inventory collection as the starting point for updating the forest polygon coverage information required in a planning inventory collection.

The forest polygon coverage in the planning inventory collection must be created based on the following standards that apply to the updated, forecasted, and projected forest stand description information.

Actual Updates

The forest polygon coverage in the planning inventory collection must be updated based on actual forest management activities and natural changes which occurred during the first two fiscal years of the currently approved plan term. The forest stand description attributes must be updated according to the standards described in Section 5.1.3.

Forecasted Changes

The forecasted changes to the forest stand description attributes based, on depletion and renewal operations planned for the last three fiscal years of the current plan term, should be completed in accordance with the standards described in Section 5.1.3. This requirement normally entails modification to the stage of development attribute, based on the silvicultural system and the type of planned depletion or renewal operations.

Similar to the actual updates, the year of update (calendar year) for forecasted changes must reflect the fiscal year of the planned depletion or renewal operations. Forest stand areas which are planned for SEM surveys do not require a forecast change to the forest stand description information as this should be a consideration of forest modelling.

Normally, the entire area of a forest stand is selected as a planned depletion area, in which case spatial updates to the forest polygon coverage are not required. If the planned harvest areas will result in a partial depletion of forest stands, then the spatial information in the forest polygon coverage should be updated to reflect the partial depletion.

The forecast harvest area (planned harvest areas + surplus harvest) for the three years of forecasted change should be consistent with the planned harvest area identified in the previous planning inventory.

Projected Changes

Projected changes to productive forest areas in the forest polygon coverage primarily affect forest stands which have not been managed or have not been affected by natural changes within the last 25 years. All productive forest areas which have not been managed through the implementation of forest management activities, or that have not been updated due to natural changes, must be re-inventoried within the current 25 year re-inventory cycle, as described in Section 5.1.3.3.2. Projected changes should only affect the tabular forest stand description attributes in a forest polygon coverage.

Any projected changes to forest stand description attributes will normally be based on growth algorithms. The height attribute may be adjusted using height, age, working group, and site class information based on regression formula which simulate the results found in Plonski's Normal Yield Tables. Any other projected changes to forest stand description information which are based on other growth algorithms must be approved by the MNR's Director, Forest Management Branch prior to their use. Growth projection models/algorithms must be supported by growth and development information or analysis of permanent sample plot data.

5.3.2.3 *Standards for the Composite Planning Inventory Information Product*

Centre-line base features must be added to the updated forest polygon coverage when creating the composite planning inventory information product. The centre-line base features must be buffered to create polygon features before they can be added to the forest polygon coverage in accordance with the technical specification prescribed by the conditions in Section 5.3.5. As well, SFL holders (plan holders) must follow the process rules described in Section 5.3.5 when combining buffered centre-line features with the forest polygon coverage. The process rules are the same for both the stewardship inventory and the planning inventory information products.

A composite planning inventory information product coverage is created once the buffered centre-line base features have been added to the updated forest polygon coverage. The information contained in the composite planning inventory information product is updated to the start date of the new plan term. Figure B-16 shows an example portion of a composite planning inventory information product.

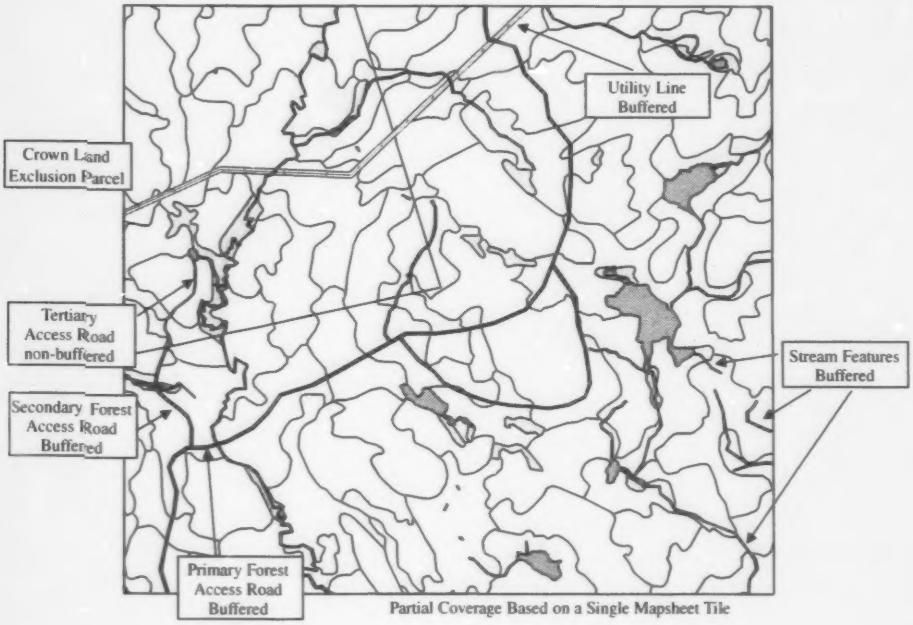
5.3.2.4 *Management Decision Information Standards*

Once the updated composite planning inventory information product is created, SFL holders (plan holders) must create information to update the following management decision attributes:

Polygon Identification
Sub Management
Forest Unit
Age
Availability Indicator
Silvicultural System
Stage of Management
Silvicultural Intensity

The creation and update of the management decision information does not affect the year of update attribute. All management decision information is based on the new plan term start date and is relevant for the term of the new plan.

Figure B-16 Illustration of a Composite Planning Inventory Information Product
Productive Forest Areas Updated/Forecasted/Projected to Start Date of New Plan Term


Utility Line Buffered
Crown Land Exclusion Parcel
Tertiary Access Road non-buffered
Stream Features Buffered
Secondary Forest Access Road Buffered
Primary Forest Access Road Buffered
Partial Coverage Based on a Single Mapsheet Tile

Polygon Identification

The polygon identification is made up of the Designated Forest Management Unit Number, the Mapsheet Tile Number, and the Polygon Number attributes. The standards for these attributes are described in Section 5.1.3. The polygon identification number in the management decision tabular attribute file must correspond directly to the polygon identification in the composite planning inventory information product.

Sub Management Unit

The sub management unit attribute represents a geographical separation or sub-division of the area within a forest management unit. In relation to forest diversity and landscape pattern, the sub management unit refers to similar areas within a forest management unit which are physically or geographically separated from each other. Examples of sub management units are ecological zones (eco-regions or eco-districts), watershed zones, wilderness zones, industrial working circles/operating units, and intensive forest management areas.

Sub management unit information is used in the preparation of forest management plan tables FMP-4 and FMP-5. Sub management unit information may also influence forest modelling and landscape diversity analysis. If a forest management unit is divided into sub management units, SFL holders (plan holders) must provide the sub management unit identification code and a name that describes the sub management unit for all licenced Crown lands within a designated forest management unit.

Forest Unit

The FMPM defines a forest unit as:

> *"An aggregation of forest stands for management purposes which have similar species composition, develop in a similar manner (both naturally and in response to silvicultural treatments), and are managed under the same silvicultural system".*

Sustainable forest licence holders (plan holders) must identify a forest unit for all productive forest areas on Crown lands within a forest management unit. The forest unit will consist of a forest unit code (maximum of six characters) and a corresponding forest unit name (maximum of 20 characters).

The forest unit information is used to create forest management plan tables FMP-8 and FMP-9. Forest unit information is also used to support the preparation of several other forest management plan tables, schedules, and reports as well as to support forest modelling, landscape diversity analysis, and the assessment of management alternatives.

Age

Age represents the average age of the dominant and co-dominant trees based on the working group species in a forest stand. The age attribute must be calculated based on the difference between the plan term start date and the forest stand year of origin. For example, if the start date of the plan term is April 1, 2003 and the year of origin for a forest stand is 1923, then the average age of the forest stand is 80 years.

Age must be determined for all productive forest areas on the forest management unit and is used to determine the age class information which is required in the preparation of several forest management plan tables, schedules, and reports. Age class, similar to age, must also be determined based on the start date of the plan term.

Availability Indicator

Sustainable forest licence holders (plan holders) must identify the areas of managed Crown production forest, by forest stand, which are available or unavailable for timber production. The determination of availability is a management planning decision based on considering the productive forest modifier (as described in Section 5.1.3), recent changes to any operational guidelines since the last plan, and reserve areas that were identified during area of concern planning (both past and present).

The productive forest modifier attribute identifies whether a forest stand is designated as production forest, production forest – designated management reserve, or protection forest. Normally, productive forest areas which are designated as production forest are considered as forest stands which are available for timber production. Productive forest areas that are designated as protection forest are usually considered as forest stands which are not available for timber production. Productive forest areas which are designated as production forest – designated management reserve are also normally considered as forest stands which are not available for timber production.

The decision regarding the availability of a forest stand area for timber management must be identified in the availability indicator attribute as either "available" or "unavailable". The sum of the available production forest area, by forest stand and age class, as determined from the age attribute should correspond to the forest unit and age class subtotals in forest management plan table FMP-9.

Silvicultural System

There are three basic silvicultural systems: clear-cut, shelterwood, and selection. Sustainable forest licence holders (plan holders) must identify the applicable silvicultural system for those forest stands that have been identified as available for timber production in the availability indicator attribute.

The stage of development attribute (described in Section 5.1.3) provides an indication of the most recent silvicultural system that was applied to each forest stand. Therefore, the silvicultural system management decision attribute should normally correspond to the silvicultural system that is associated with the stage of development attribute. However, SFL holders (plan holders) may identify a more appropriate silvicultural system based on the forest unit for the purposes of the new forest management plan. Therefore, the silvicultural system attribute represents the silvicultural system that will be applied to a forest stand. In some cases, this may differ from the silvicultural system that was employed in the past. The silvicultural system must be identified for each stand, although it is normally assigned on a forest unit basis.

Stage of Management

The stage of management attribute indicates the next harvest or cut treatment that is scheduled to occur for a productive forest stand. The stage of management depends on the silvicultural system employed. Sustainable forest licence holders (plan holders) must identify the next stage of management that will occur for each forest stand which is available for timber production based on the availability indicator attribute. Table B-4 identifies the applicable stages of management for each silvicultural system.

The stage of management often corresponds to the stage of development attribute. The stage of development attribute represents the current development state, and/or the current stage of silvicultural management for each productive forest stand. The standards for the stage of development attribute are described in Section 5.1.3.

Table B-4 Stages of Management Attributes

Silvicultural System	Stage of Management
Clear-cut	Clear-cut (conventional/modified) Precommercial/Commercially Thinned/Spaced
Shelterwood	Prep Cut Seed Cut First Removal Final Removal
Selection	Selection Cut Improvement Cut

The stage of management attribute is used in the preparation of forest management plan table FMP-9. The stage of management is most applicable to the forest stands that have been selected for planned operations (harvest and renewal) within the new plan term.

Silvicultural Intensity

Silvicultural intensities are levels of forest management that apply only to even-aged forest stands that are managed under the clear-cut silvicultural system. Silvicultural intensity is a term used in forest modelling to depict a specific regime of teatments and provides an indicator of productivity, the expected growth and development pattern, and the relative degree of effort required to regenerate forest stands to a free-growing condition.

For forest stands that are managed under the shelterwood silvicultural system, the stage of development, understory, and stage of management attributes, describe the silvicultural regimes and provide equivalent information to indicate silvicultural intensity. Similarly, for stands managed under the selection silvicultural system, the stage of development, basal area distribution, and stage of management attributes, also describe the silvicultural regimes and provide equivalent information to indicate silvicultural intensity.

Silvicultural intensity is normally assigned on a forest unit basis, therefore, it should be consistent with the silvicultural ground rules in the forest management plan and the information applied in forest modelling.

There are typically five types of silvicultural intensity classes:

Present (abbreviated as Prsnt) which represents existing natural forest growth and future forest growth following natural disturbances.

Extensive (abbreviated as Exten) which represents inexpensive options such as natural regeneration or natural regeneration and protection from fires, insects, and disease

Basic (abbreviated as Basic) for mid-cost, assisted natural regeneration options such as scarification, cone scattering, direct seeding, and subsequent release where necessary

Intensive (abbreviated as Inten) which represents more expensive options such as site preparation, planting of nursery stock, vegetation management, and perhaps pre-commercial thinning

Elite (abbreviated as Elite) for highly intensive and usually expensive options such as site preparation, planting of genetically improved nursery stock, vegetation management, or pre-commercial thinning with multiple tendings and cleanings.

Silvicultural intensity may be separated into sub-intensities which allow more than one type of treatment regime, expenditure level, effort level, and/or expected growth and development pattern, such as:

Inten-1: CLAAG, light scarification, assisted planting
Inten-2: Strip cut, shear blade, planting

This example may apply to the management of a black spruce forest unit where the regime of silvicultural treatments are considered as intensive treatments, but the expenditures and future growth and development patterns may vary considerably.

The silvicultural intensity is a transitional attribute that must be completed as production forest areas are managed, or for which management is planned. For the purpose of creating a composite planning inventory information product, silvicultural intensity must be determined for forest stands which have been managed, depleted, and have received a renewal treatment over the two plan terms prior to the start date of the new plan term. The silvicultural intensity information must also be completed for forest stands which have been selected for harvest operations for the new plan term.

Sustainable forest licence holders (plan holders) are required to provide the silvicultural intensity and corresponding sub-intensities for the two previous plan terms and for the new plan term. This requirement will take effect for plan terms beginning on April 1, 2004 and affect all future plan terms after this date. Therefore, based on a five year plan term, silvicultural intensities for all forest stands managed under the clear-cut silvicultural system would be required for plan terms beginning: April 1, 1994 to March 31, 1999, from April 1, 1999 to March 31, 2004 and for the new plan term starting April 1, 2004. The silvicultural intensity information must be maintained from one plan term to the next, or updated as required with each successive planning inventory requirement.

5.3.2.5 *Standards for Planning Coverage Information*

As described in Section 5.3.1.6, there are three requirements for the planning coverage information:

- **a)** Planned Harvest and AOC Reserve Areas
- **b)** Road Use Strategy for Existing Roads
- **c)** Road Corridor Locations for Planned Road Construction

The spatial standards for the planning coverages are equivalent to the spatial information standards for inventory base features information and the forest polygon coverage information described in Sections 5.1.2 and 5.1.3, respectively. The composite planning inventory information product reflects these base feature information standards and is used as the base fabric to define the map extent for creating and updating information in the planning coverages. The roads centre-line base feature coverage also provides a base reference fabric for identifying the Road Use Strategy for Existing Roads coverage information and the Road Corridor Locations for Planned Road Construction coverage information.

5.3.2.5.1 Planned Harvest and AOC Reserve Areas Coverage Standards

Normally, the entire forest stand boundary and its area is selected from the composite planning inventory information product as the area which is proposed for harvest depletions during operational planning. The harvest areas are further subdivided into planned harvest areas and surplus harvest areas. The planned harvest areas may also be organized into different operating blocks for the purpose of harvest scheduling and consolidation of harvest areas.

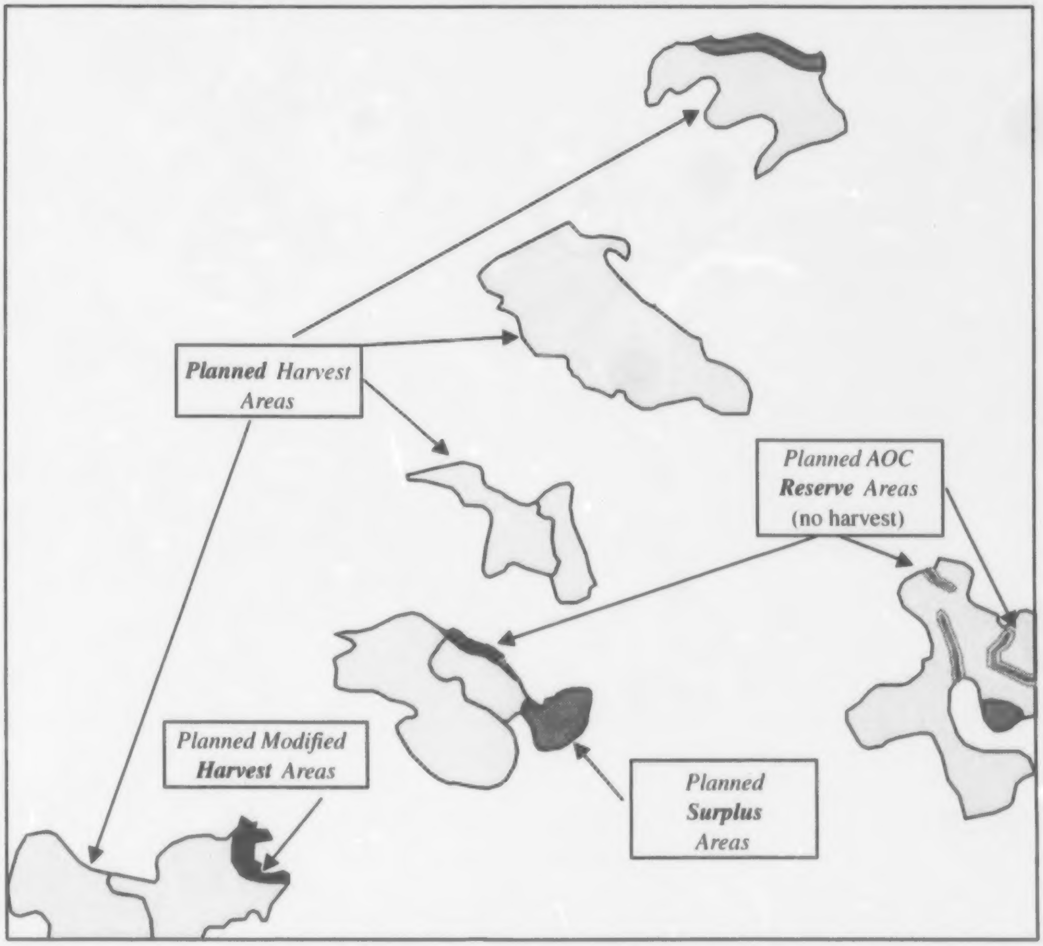
This coverage contains both spatial and tabular attributes which must correspond with the stand listing information contained within the supplementary documentation for the new forest management plan. The information contained in this coverage must also correspond to Areas Selected For Operations Maps which are required in stage four of the public consultation process in accordance with the FMPM. The requirements and standards for Areas Selected for Operations Maps are described in Part E of the FIM. Figure B-17 illustrates an example of a planned harvest and AOC reserves areas coverage showing planned harvest areas (harvest, modified, and surplus) and AOC reserve areas selected for the term of the new plan.

The harvest area must contain the following tabular attributes:

Designated Forest Management Unit Number
Mapsheet Tile Number
Polygon Number
Harvest Operating Block Identification
Depletion Type Polygon Identification
Depletion Type
AOC Identification
Area

Figure B-17 Illustration of a completed Planned Harvest and AOC Reserve Areas Coverage

Assume 5 Year Plan Term: April 1, 2004 to March 31, 2009


Planned Harvest Areas
Planned AOC *Reserve* Areas (no harvest)
Planned Modified *Harvest* Areas
Planned *Surplus* Areas

Partial Coverage Based on a Single Mapsheet Tile

The Designated Forest Management Unit Number, the Mapsheet Number, and the Polygon Number attributes must correspond to the same attributes and standards as maintained in the composite planning inventory information product coverage. The standards for these attributes are described in Section 5.1.3.

Harvest Operating Block Identification

The harvest operating block identification is a means of identifying a group of forest stands that are selected for harvest operations during the new plan term. The harvest operating block identification must be the same as the corresponding operating block identification which is portrayed on the Areas Selected for Operations Maps. All forest stands, which are selected for harvest operations in the new plan term, must have a harvest operating block identification.

Depletion Type Polygon Identification

The purpose of this attribute is to distinguish between two polygons which are formed when portions of the same forest stand are allocated for different types of depletion, such as in the case of a planned harvest area and a reserve area that are part of the same forest stand polygon. The depletion type polygon identification attribute can be a sequentially assigned identification number, such as a record number, or form part of the identification of the polygon number for the parent forest stand.

Depletion Type

The depletion type must be identified as one of the following:

a) Planned Harvest Area
b) Planned Modified Harvest Area (partial harvest permitted)
c) Planned Salvage Area
d) Planned Surplus Area
e) Planned AOC Reserve Area (no harvest permitted)

Planned Harvest Area: The planned harvest area is that portion of the total harvest area that has been selected for normal harvest during the term of the new forest management plan.

Planned Modified Harvest Area: The planned modified harvest area is a portion of the total harvest area that has been designated as an area where partial or restricted harvesting can occur. The modified harvest area is identified through AOC planning (as part of the prescriptions for AOCs) and is often adjacent to reserve areas and associated with the protection of a value.

Planned Salvage Area: The planned salvage area is the area where salvage operations are planned. The salvage area, as defined in the FMPM, does not contribute to the available harvest area.

Planned Surplus Area: The planned surplus area is that portion of the total harvest area that can be harvested during the term of the new forest management plan, but is not required to fulfill the wood volume needs and commitments of the mills and SFL holders who receive timber volume from the forest management unit.

Planned AOC Reserve Area: The planned AOC reserve area, which is associated with the harvest areas and which has been identified through AOC planning, must be shown as part of this coverage. Planned AOC reserve areas may be associated with planned harvest, planned modified harvest, planned salvage, and planned surplus areas. The planned AOC reserve area is usually a distinct portion of a harvest area which is adjacent to a value. The planned AOC reserve area is identified by the depletion type attribute. The planned AOC reserve area (no harvest permitted) identifies that portion of the harvest area where no harvesting of trees is permitted. Planned AOC reserve areas must contain the identification of the AOC in the AOC identification attribute.

Area

The area tabular attribute represents the size of the harvest area in hectares. This value is derived from the actual area (in square metres) which is maintained as a spatial attribute. The area tabular attribute must be rounded to the nearest 1/10 (0.1) of a hectare as described in Section 5.1.3.2.2.

AOC Identification

The AOC Identification provides the identity of the actual AOC associated with a value or set of values. The AOC identification provides a direct linkage to the AOC prescription for each value. The AOC identification is only required where there are AOCs associated with the planned harvest areas.

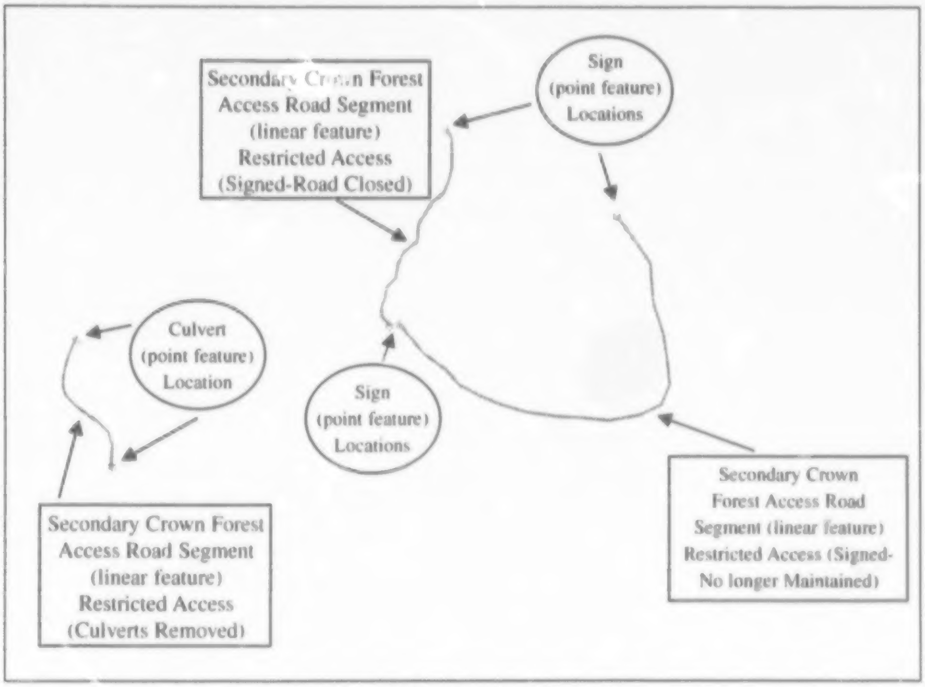
5.3.2.5.2 Standards for the Road Use Strategy for Existing Roads Coverage

The roads centre-line base features coverage must be used as the base fabric for the road use strategy for existing roads coverage. The road features identified in this coverage are represented as either linear or point spatial feature types. The standards for spatial information in this coverage will be the same as the standards for the roads centre-line base feature coverage, as described in Section 5.1.2. This coverage must identify the roads, which will; no longer be maintained, be used and upgraded for use, be abandoned, and have restricted access during the new plan term.

Since both linear and point feature spatial information is required, sustainable forest licence holders (plan holders) may either combine these features and provide them in one coverage or provide them in separate coverages. Figure B-18 illustrates an example of a road use strategy for existing roads coverage. In this example, the road centre-lines (linear features) which are affected by access/use restrictions and road use status have been combined with access restriction type (point features) into a single coverage which corresponds to the road use management strategy in an approved forest management plan.

Sustainable forest licence holders (plan holders) are not required to identify road features (points) which are not relevant to, or part of, an access road restriction (e.g., a culvert on an active forest management road). Sustainable forest licence holders (plan holders) are also not required to provide roads information related to tertiary roads, as defined in accordance with the FMPM.

Figure B-18 Illustration of a Road Use Strategy for Existing Roads Coverage
Assume 5 Year Plan Term: April 1, 2004 to March 31, 2009


Secondary Crown Forest Access Road Segment (linear feature) Restricted Access (Signed-Road Closed)
Sign (point feature) Locations
Culvert (point feature) Location
Sign (point feature) Locations
Secondary Crown Forest Access Road Segment (linear feature) Restricted Access (Culverts Removed)
Secondary Crown Forest Access Road Segment (linear feature) Restricted Access (Signed-No longer Maintained)

Partial Coverage Based on a Single Mapsheet Tile

The following tabular attributes must be identified for each road feature (linear or point) identified in the road use strategy for existing roads coverage:

Linear Feature Attributes

Road Linear Feature Type
Road Identification
Plan Term Year
Access Restriction/Use Restriction Type
Road Use Status Indicator

Point Feature Attributes

Road Access Restriction Feature
Road Access Restriction Feature ID
Road Identification

These tabular attributes must correspond to the road use management strategy that identifies planned roads activities in the remaining term of the current plan and the new plan term.

Since the road use strategy for existing roads coverage utilizes the updated roads centre-line base feature coverage as its base fabric, the tabular attributes that describe the road use management information may be appended, where appropriate, to a copy of the updated roads centre-line base feature coverage. In this case, the tabular road use management information must be related to the spatial information by the road identification attribute. In other cases, only a particular portion of road, called a road segment, is required. Therefore, the appropriate road segment is copied from the roads centre-line base features coverage to the road use strategy for existing roads coverage. The tabular attributes for the linear road segment and any related point features must be completed for each road segment contained in this coverage.

The road use strategy for existing roads coverage may contain other attribute information which further describes the road use features on a forest management unit. These other attributes will be defined in the roads centre-line base features coverage as described in Section 5.1.2. The information in the road use strategy for existing roads coverage must be spatially compatible with the roads centre-line base feature coverage such that the forecast coverage can be overlaid and joined with the base feature coverage.

Road Linear Feature Type (linear feature)

The road linear feature type attribute identifies the type of road as a primary or secondary forest access road, as described by the FMPM.

Road Identification (linear feature)

The road identification is the name, label, or number given to an existing or planned forest access road. The road identification must be the same as the road identification which is portrayed on the Areas Selected for Operations Maps. Road identification is the same when referencing a road point feature or a road linear feature.

Plan Term Year (linear feature)

The plan term year attribute identifies the year of the forest management plan in which the forecast for road construction/use was approved. The plan term year is recorded as the start of the plan term (e.g., the 2004 – 2009 plan term is recorded as 2004).

Access Restriction/Use Restriction Type (linear feature)

The access restriction/use restriction type attribute identifies the method of restricting road access or any restrictions which affect how and/or when a forest access road may be used. The access restriction/use restriction type is only completed for existing forest access roads for which access will be restricted or where conditions that affect road use will be applied during the remaining term of the current forest management plan and the term of the new plan.

One of the following choices must be identified for the access restriction type:

Access Restrictions
  Burmed/Ditched
  Scarified
  Gated
  Signed
  Culvert/Bridge Removal
  Other – Specify

Use Restriction

- Vehicle Type/Weight Limitations
- Seasonal Use
- Scheduled Use (Days, hours, etc.)
- Traditional Use/Specified Use Only
- Other – Specify

Road Use Status Indicator (linear feature)

The road use status indicator attribute provides an indication of the planned use of primary and secondary Crown forest access roads for forest management purposes in terms of whether or not a road is actively used, maintained, will be upgraded or abandoned. This information is required only for roads where their forest management related use is expected to change (i.e., a change in their status) in the remaining term of the currently approved plan or within the new plan term. This information is not required for roads which are not active or where the status of road use will not change in the remainder of the current plan term or the new plan term.

One of the following choices must be identified for the road use status indicator:

- No longer maintained and no longer active
- No longer maintained but still active
- Maintained and active
- Abandoned
- Upgraded

The chosen road use status indicator must correspond to the road use management strategy in the approved forest management plan or the new plan term. Active roads are considered roads which are used for forest management purposes. Maintenance refers to the general upkeep of the road such as grading, gravel, clearing, etc. Abandoned roads are Crown forest access roads that will no longer be required for forest management planning purposes. An upgraded indication identifies a change to the original construction standards of the road, such as a widening of the road or road right of way, a new surface, or a new path.

Road Access Restriction Feature (point feature)

The road access restriction feature attribute identifies the different types of control points that affect forest road access and use. The road point feature type is only required for forest access roads on Crown lands on which some type of access restriction has been planned. The actual point is the geographic location where an access restriction will be put in place. Sustainable forest licence holders (plan holders) must identify all road point features by type of restriction for the remaining current plan term and the new plan term.

The road access restriction feature must be identified as one of the following feature types:

- Burms
- Ditches
- Scarification (Road Removal) Point
- Gates
- Sign Postings
- Culverts Removal
- Bridge Removal
- Other Obstructions or Points of Control that Restrict Access – Specify

In some cases, road access restriction features such as gates or signs may appear at two points on a road segment if the road is part of closed loop road network. Figure B-18 illustrates the two points of access control for a sign posting road access restriction feature.

Road Access Restriction Feature ID

The road access restriction feature ID is the name, label, or number given to the point feature. This is assigned by the SFL holder (plan holder) and should be determined and assigned in a consistent manner. For every road access restriction ID there must be a road identification attribute assigned to ensure that the point of restriction applies to a specific road or road segment.

5.3.2.5.3 Standards for Road Corridor Locations for Planned Road Construction Coverage

Sustainable forest licence holders (plan holders) must provide a coverage which identifies the corridor locations for planned construction of primary and secondary forest access roads. This requirement applies to Crown forest access roads to be constructed by the SFL holder (plan holder) for the remaining term of the currently approved forest management plan and for the term of the new plan. The roads centre-line base features information is used as a base reference to develop this coverage. The roads features maintained in this coverage are comprised of polygon spatial features only, which represent the road corridors within which road construction will occur and a new road will be located. Figure B-19 illustrates an example of the road corridor locations for planned road construction coverage.

Planned primary and secondary road corridors which do not traverse AOCs must be represented as polygon features that have width dimensions of 500 metres. Where a primary or secondary forest access road corridor traverses an AOC, the primary or secondary forest access road corridor must be represented as a polygon feature that has a width dimension of 100 metres.

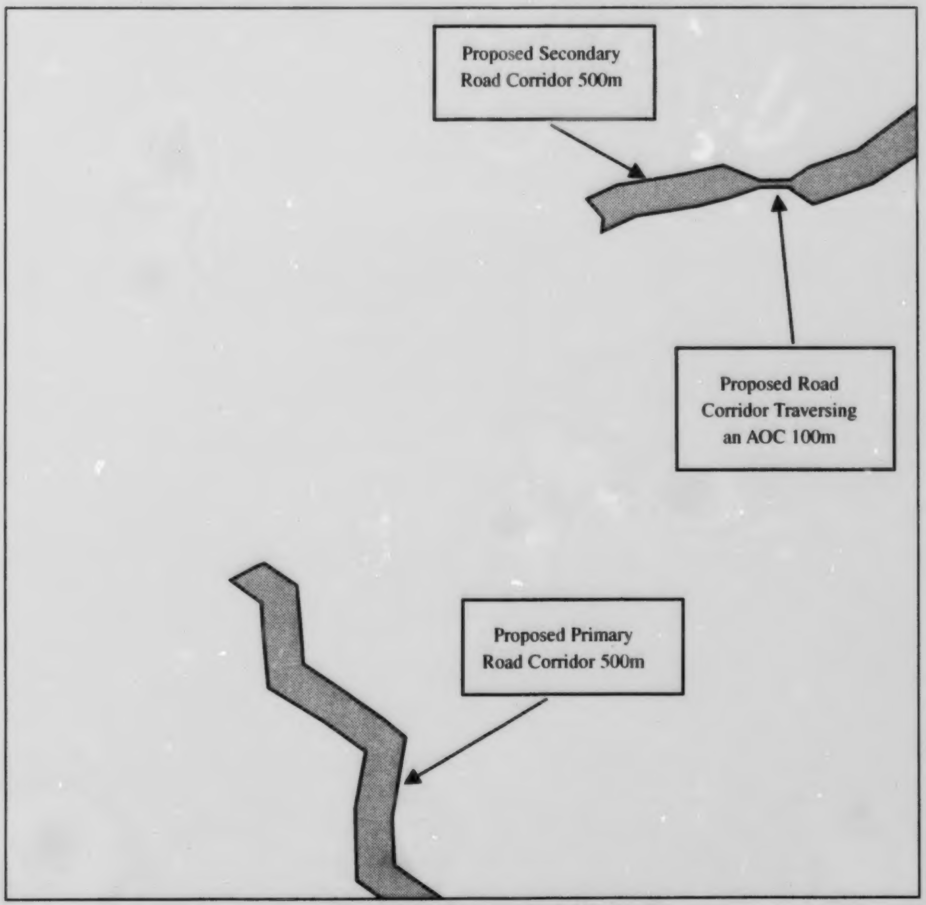
The following tabular attributes must be provided for each road corridor polygon identified in the road corridor locations for planned road construction coverage:

Road Polygon Feature Type
Road Identification
Plan Term Year
AOC Identifier

The road polygon feature type attribute must be identified as either primary or secondary. The information standards for the road identification attribute and the plan term year attribute are the same as those contained in the Road Use Strategy for Existing Roads Coverage. The information standards for the AOC identifier attribute are the same as those contained in the Planned Harvest and AOC Reserve Areas Coverage.

Figure B-19 Illustration of Road Corridor Locations for Planned Road Construction Coverage

Assume 5 Year Plan Term: April 1, 2004 to March 31, 2009


Proposed Secondary Road Corridor 500m
Proposed Road Corridor Traversing an AOC 100m
Proposed Primary Road Corridor 500m

Partial Coverage Based on a Single Mapsheet Tile

T.03

5.3.3 Roles and Responsibilities for the Planning Inventory

Sustainable forest licence holders (plan holders) are responsible for updating and maintaining information in the planning inventory collection, composite planning inventory information product, management decision information and the planning coverages, in accordance with the requirements and standards described in Sections 5.3.1 and 5.3.2, respectively. Sustainable forest licence holders (plan holders) are also responsible for assembling the composite planning inventory information product and the planning coverages in accordance with these same requirements and standards.

The MNR will ensure that information contained in the planning inventory collection, the composite planning inventory information product, and the planned forecast coverages are checked for completeness and verified for accuracy. The MNR will also ensure that the management decision information is complete and that it has been correctly appended to the composite planning inventory information product.

Both the MNR and the SFL holders (plan holders) must archive the planning inventory information, which has been received or provided by either party, in accordance with this manual. The original information must be copied before it can be changed or updated. In the case of any discrepancy, the SFL holder (plan holder) will hold the original planning inventory information pertaining to licenced Crown lands on a forest management unit. Similarly, the MNR will normally hold the original FRI for non-Crown lands and Crown land exclusions, and inventory base features information for all lands on a forest management unit.

5.3.3.1 *Checking for Completeness and Verifying for Accuracy*

The MNR and SFL holders (plan holders) must check that information provided by either party is complete. Checking for completeness includes, but is not limited to, ensuring that:

a) the spatial area for each coverage in the planning inventory collection, the composite planning inventory information product, and the plan forest coverages is correctly represented for:

- area delineation
- correct representation of area and spatial features by theme based on the designated forest management unit area extent
- no overlapping areas or holes (sliver management)
- correct total area
- correct datum, map projection, and coordinate requirements

b) the correct data contents for spatial and tabular attributes required in each coverage as described by the applicable standards

c) the compatibility of the coverages, i.e., no overlapping polygons, proper use of coincident or contiguous lines, same geo-referenced map extents based on a forest management unit boundary

d) the correct digital formats in accordance with the conditions and technical specifications

The MNR must also verify that the information is accurate. Considerations when verifying for accuracy are based on receipt of the different parts of a planning inventory in accordance with the timelines described in Section 5.3.4. Verifying the accuracy of the planning inventory information should be focused on whether information meets the requirements and standards described in Sections 5.3.1 and 5.3.2. These considerations include, but are not limited to, verifying the following planning inventory components at the identified timeframe (in brackets):

a) Planning Inventory Collection (Invitation to Participate)

- the inventory base features information and the FRI for non-Crown lands and Crown land exclusions provided by the MNR have been correctly applied to the updated planning inventory collection information
- updates to the inventory base feature information are consistent with the applicable updates to the forest polygon coverage for the forest management unit
- the spatial and tabular information in the forest polygon coverage has been updated correctly based on forest management activities and natural changes to Crown areas that occurred during the start of the current plan term
- the spatial and tabular information in the forest polygon coverage has been forecasted correctly based on planned forest management activities for the remainder of the current plan term
- the vintage of the information is correctly applied and falls within the requirements for the re-inventory period

b) Composite Planning Inventory Information Product (Invitation to Participate)

- the updated forest polygon coverage information and the updated centre-line base features have been correctly assembled into a composite planning inventory information product
- the composite planning inventory information product contains sufficient information to support the remaining forest management plan development process which includes: land base summary, forest modelling, habitat supply modelling, landscape diversity analysis, identification of eligible areas for operations, and selection of planned areas of operations and road construction for the new plan term

c) **Management Decision Information (Issuance of Notice for First Information Centre)**

- the management decision attributes correctly reflect forest level decisions made in developing the forest management plan
- the management decision attributes can be correctly appended to the appropriate spatial and tabular forest stand information in the composite planning inventory information product
- the management decision information is correct and supports the remaining forest management plan development process which includes: land base aggregation, silvicultural ground rule development, forest modelling, habitat supply modelling, landscape diversity analysis, identification of eligible areas for operations, and selection of forecast operations areas and road construction for the new plan term

d) **Planning Coverages (Draft Plan Submission)**

- the harvest (planned and surplus areas) and AOC reserve areas contained in the Planned Harvest and AOC Reserve Areas Coverage, for the new plan term, are identified on a stand by stand basis using the composite planning inventory information product which was provided at the invitation to participate stage
- the roads centre-line base feature coverage was correctly applied as the base fabric for the Road Use Strategy for Existing Roads Coverage and used as a base reference for the Road Corridor Locations for Planned Road Construction Coverage
- the Road Corridor Locations for Planned Road Construction Coverage correctly identifies road corridor locations and areas where road corridors cross AOCs for the remainder of the current plan and roads for the new plan term
- the planning coverages are consistent with existing inventory base features coverages, composite planning inventory information product, values maps, and the operations maps identified in Part E, which have been prepared in conjunction with the new forest management plan

e) **Submission of Revised Information (Submission of Final Plan – Revisions Made)**

- the planning inventory information provided with the final plan (if required) accurately reflects the approved forest management plan in all planning inventory aspects (i.e., planning inventory collection, composite planning inventory information product, and the plan forecast coverages)
- the planning inventory supports decisions made in the approved forest management plan

Checking the planning inventory information for completeness should normally occur within 60 working days of receiving the different information components as described by the timelines in Section 5.3.4. Verification for accuracy should also occur within 60 working days of receiving the information. Within these 60 working days, the receiving party must notify the other party that the information has been checked for completeness and verified for accuracy and whether or not the information meets the requirements prescribed by this manual. If the verification process requires an extension due to errors or inconsistency in the information provided, the receiving party must notify the provider concerning the nature of the discrepancy and the time needed to complete the verification process.

If the information does not meet the requirements described by this manual, the receiving party must provide a description of the errors or the reasons why the planning inventory information does not meet the requirements. The two parties must determine the extent of the corrections required and the earliest timeframe in which the required revisions to the affected planning inventory should be resubmitted such that it does not affect the completion of the new forest management plan.

5.3.3.2 *Source Data and Records*

The MNR may require access to, or provision of, the source data, records, and information from SFL holders (plan holders) which they used to create or update the planning inventory information (planning inventory collection, composite planning inventory information product, management decision information, and planning coverages). The MNR may make such requests for access to, or provision of, source data, records, and information for the purpose of checking the completeness or verifying the accuracy of planning inventory information.

The MNR will respect the intellectual property rights of the SFL holders (plan holders) in using the source data, records, and information for these purposes and the source data, records, and information will be treated in accordance with Part A, Sections 1.2 and 1.4.

5.3.4 Timelines for the Planning Inventory

There are three distinct timelines, based the forest management plan development process, by which different components of the planning inventory must be provided by SFL holders (plan holders):

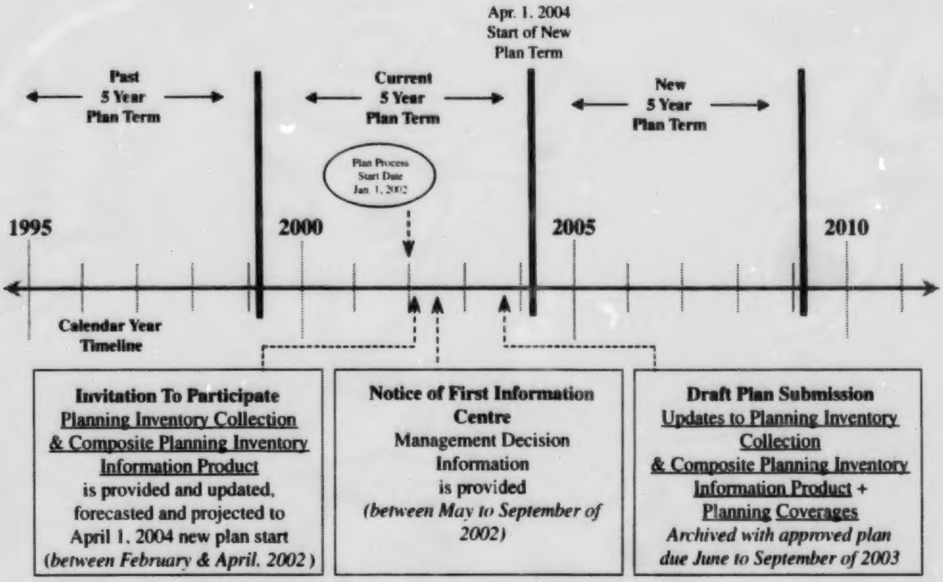
a) Invitation to Participate
b) Issuance of Notice for First Information Centre
c) Draft Plan Submission

Figure B-20 illustrates the timelines for providing the planning inventory information. All planning inventory information must be provided to the appropriate MNR District Manager responsible for appointing the members of the planning team in accordance with the FMPM.

The MNR must ensure that all inventory base feature information and an FRI for non-Crown lands and Crown land exclusions is provided to the SFL holders (plan holders) at least six months prior to the start of a new forest management planning process. This date would be the July 1 prior to the start date of a new planning process, assuming that the process started on January 1. Based on Figure B-20, the MNR must ensure that this information is provided to SFL holders (plan holders) by July 1, 2001 for a plan, which will be prepared for a term that starts on April 1, 2004.

Figure B-20 Timelines for the Planning Inventory Collection, the Composite Planning Inventory Information Product, and the Planning Coverage information

Assume 5 Year, Planning Term cycle: 199 – 2004, 2004 – 2009 etc.


Apr. 1. 2004
Start of New
Plan Term
Past
5 Year
Plan Term
Current
5 Year
Plan Term
New
5 Year
Plan Term
Plan Process
Start Date
Jan 1, 2002
1995
2000
2005
2010
Calendar Year
Timeline
Invitation To Participate
Planning Inventory Collection
& Composite Planning Inventory
Information Product
is provided and updated,
forecasted and projected to
April 1. 2004 new plan start
(between February & April. 2002)
Notice of First Information
Centre
Management Decision
Information
is provided
(between May to September of
2002)
Draft Plan Submission
Updates to Planning Inventory
Collection
& Composite Planning Inventory
Information Product +
Planning Coverages
Archived with approved plan
due June to September of 2003

5.3.4.1 *Invitation To Participate*

Sustainable forest licence holders (plan holders) must provide the following planning inventory information at the invitation to participate stage in the public consultation process for forest management planning:

i. An updated planning inventory collection containing inventory base feature coverages where information has changed from the coverages provided to SFL holders (plan holders) by the MNR (six months prior to the start of a new planning process) and containing the updated forest polygon coverage.

ii. A composite planning inventory information product which has been assembled from the inventory base features information and the forest polygon coverage, and which contains the adjusted areas resulting from buffered centre-line features and information which has been updated, forecasted and projected to the start of the new plan term.

5.3.4.2 *Issuance of Notice for First Information Centre*

Sustainable forest licence holders (plan holders) must provide management decision information for all attributes with the exception of the silvicultural intensity attribute to the MNR at the time that the Notice of the First information Centre is issued.

5.3.4.3 *Draft Plan Submission*

Sustainable forest licence holders (plan holders) must provide the following planning inventory components with submission of the draft forest management plan:

- **i.** The planning coverages which consist of:
  - **a)** Planned Harvest and AOC Reserve Areas
  - **b)** Road Use Strategy for Existing Roads
  - **c)** Road Corridor Locations for Planned Road Construction

- **ii.** Any significant updates to the planning inventory collection information or the composite planning inventory information product since submission at the invitation to participate. The silvicultural intensity – management decision attribute must also be included with the draft plan submission.

5.3.4.4 *First Dates of Effect for Planning Inventory Information*

The first effective dates and the requirements for planning inventory information are divided into three periods:

- **a)** Plan Terms Starting on April 1, 2001 and April 1, 2002
- **b)** Plan Terms Starting on April 1, 2003
- **c)** Plan Terms Starting on April 1, 2004 and Beyond

Plan Terms Starting on April 1, 2001 and April 1, 2002

Sustainable forest licence holders (plan holders) with plan terms that commence on April 1, 2001 and April 1, 2002 must provide the MNR with a copy of the updated FRI that was prepared for the development of those forest management plans. This inventory must be provided to the appropriate MNR District Manager within six months of the plan start date.

The updated information contained in an FRI for these plan terms must contain spatial and tabular information that is compatible with the ARC/INFO methodology for maintaining topologic data.

These FRIs must contain updates and forecasts of FRI data which are current to the start dates for these plans as described in the FMPM. The information must be updated for all former STANF attribute information. Sustainable forest licence holders (plan holders) whose plans commence on April 1, 2001 or April 1, 2002 are not required to provide the planning inventory collection, the composite planning inventory information product, management decision information or the planning coverages, as described in Section 5.3.

MNR will verify that the FRI provided by the SFL holder (plan holder) reflects the inventory information which was used in the preparation of the forest management plan for which it was created and/or updated. MNR will verify the information within 60 working days of receiving it.

Plan Terms Starting on April 1, 2003

Planning teams, associated with plan terms which commence on April 1, 2003, will have created an updated FRI for the new plan, which commences on April 1, 2003, prior to the implementation of this manual. Therefore, SFL holders (plan holders) are required to provide their updated FRI two months prior to the start of the First Information Centre. These FRIs must contain updates and forecasts of FRI data which are current to the start dates for these plans as described in the FMPM. Sustainable forest licence holders (plan holders) whose plans commence on April 1, 2003 are not required to provide a composite planning inventory information product or any of the coverages required in a planning inventory collection.

The format of an FRI may vary depending on how an SFL holder (plan holder) maintains the information. The MNR and the SFL holder (plan holder) will jointly determine the most efficient and cost-effective method and formats to transfer the requested FRI information. The updated information contained in an FRI for these plan terms must contain spatial and tabular information that is compatible with the ARC/INFO methodology for maintaining topologic data. The format of the updated FRI should be similar to the FRI which was previously produced in cooperation with the SFL holder (plan holder) or which was transferred to the SFL holder (plan holder) upon creation of the SFL. However, MNR will consider other formats for FRI, such as seamless coverages, if the original FRI product has been modified. In these cases, both MNR and SFL holders (plan holders) will consult with each to determine efficient and cost-effective way to transfer the required FRI information.

Sustainable forest licence holders (plan holders) with plan terms that commence on April 1, 2003 are not required to provide transitional attribute information as part of the updated FRI. Sustainable forest licence holders (plan holders) must provide the planning coverages at the draft plan submission stage. Any significant changes or updates to the FRI must also be provided at the draft plan submission stage.

The MNR will verify that the FRI which is provided by SFL holders (plan holders) has been updated for the purpose of preparing the forest management plan and reflects the inventory information which has been used in that plan. The MNR will verify the information within 60 days of receiving it.

Plan Terms Starting on April 1, 2004 and Beyond

The first date of effect for provision of a complete planning inventory (i.e., planning inventory collection, composite planning inventory information product, management decision information and planning coverages) by SFL holders (plan holders) in accordance with this manual is for a plan term which commences on April 1, 2004. Sustainable forest licence holders (plan holders) with plans that commence on April 1, 2004 and beyond must meet the full information requirements described in Section 5.3.

The MNR must check the completeness and verify the accuracy of the planning inventory information provided by SFL holders (plan holders) within 60 working days of receiving the information. Checking and verification will be carried out in accordance with the roles and responsibilities described in Section 5.3.3. Within the 60 working day period, the MNR will provide the SFL holder (plan holder) with a confirmation of acceptance of the information or a notification that the information was not accepted. A notification of non-acceptance will identify the information which requires revisions. The MNR will determine the time required to make the required revisions based on consultation with the affected SFL (holder) plan holder.

5.3.5 Conditions for the Planning Inventory

Sustainable forest licence holders (plan holders) must provide the MNR with planning inventory information in a digital format, as described in the *Technical Specifications for Providing the Planning Inventory Information*. These specifications describe the digital format and detailed data standards for providing a planning inventory collection, a composite planning inventory information product, management decision information and the planning coverages.

The technical specifications for providing inventory base features information and FRI information for non-Crown lands and Crown land exclusions are the same for both the stewardship inventory and the planning inventory collections. The MNR must ensure that SFL holders (plan holders) are provided with digital inventory base features information as described in the *Technical Specifications for Providing Forest Resources Inventory Information*. The MNR must also ensure that SFL holders (plan holders) are provided with a digital inventory of forest resources for non-Crown lands and Crown land exclusions for their licence areas that is compatible and consistent with the planning inventory collection information (forest polygon coverage) as described by the technical specifications.

The *Technical Specifications for Providing Planning Inventory Information* may describe detailed data standards relating to change-data and/or quality control measures for ensuring the quality of change-data for each of the components in a planning inventory. The technical specifications may further describe the process rules and detailed data standards for modifying inventory base feature information and assembling the revised base features into the a forest polygon coverage, a composite inventory information product, or a planning coverage, as described in Section 5.3.

6.0 INFORMATION SYSTEMS USED IN FOREST MANAGEMENT PLANNING

This section identifies the requirements for information needed to support various information systems which are used in forest management planning. As described in Part A, information systems include, but are not limited to:

a) Database management systems used for storing, maintaining, querying, and reporting data and information
b) Analytical tools or decision-support systems used to model, project, simulate, or forecast data and information
c) Geographical information systems (GIS) used to manage and analyze spatial data and information.

The FIM does not prescribe the requirements for SFL holders (plan holders) or planning teams to employ or utilize specific information systems. The FMPM identifies the requirements and considerations for planning teams to conduct an analysis of management alternatives. Consequently, planning teams, with assistance from MNR regional and provincial offices, determine the information systems (analytical models/tools) which will be used to support the analysis of management alternatives and the development of decisions in forest management plans. This approach maintains the incentive to investigate and to promote the development of new and innovative information systems (analytical tools, decision-support systems, and information reporting and querying systems).

The FIM prescribes the requirements for provision of information which is used in or produced from information systems, which are applied in the production, implementation, monitoring, and subsequent evaluation of forest management plans. The required information must be provided in a specific format, and contain sufficient information that can be imported, applied, and verified using the same or equivalent information systems used by the MNR. The FIM also prescribes the requirements to provide access to information systems which are used for forest management purposes.

The terms of reference for a forest management plan identify the types of information systems that will be employed in the development of the plan as well as the duties of the planning team members responsible for conducting analyses and assessing management alternatives. The FIM expands upon these responsibilities and identifies the requirement to provide information such as the inputs, outputs, assumptions, constraints, objectives, and management scenarios that are applied to each information system employed by the planning team.

The information and information products prescribed in this section describe much of the background information needed to support the following forest management plan components:

- benchmarking of historic and current forest conditions
- identification of long-term strategic direction
- determination of sustainability using criteria and indicators
- analysis and assessment of management alternatives
- selection of preferred management alternative
- determination of available harvest areas
- determination of areas eligible for operations during the 20-year period of the plan
- selection and layout of areas for operations in the five-year term of the plan

The following types of analyses utilize the information prescribed in Part B and are used to support the development of various forest management plan components:

- socio-economic analysis and demographic profiling
- net primary productivity analysis
- landscape processes and diversity modelling
- forest modelling
- habitat supply analysis
- viewscape analysis
- forest management planning summary tables and reports

The information and information products prescribed in Section 6.0 are based on these types of analyses and identify information which is required for strategic (beyond the plan term) and operational (for the plan term) components of a forest management plan. The information and information products prescribed for annual work scheduling and annual reporting, which are linked with strategic and operational information and information systems, are described in Part C and Part D, respectively.

6.1 Requirements for Information in Forest Management Planning Information Systems

The requirements for information, used in forest management planning information systems, are described in the following sub-sections: new information systems considered for forest management planning; information systems used for forest management planning; information produced from information systems; and source data, records and information, and processes used to create information applied in information systems.

6.1.1 Requirements for New Information Systems Considered for Forest Management Planning

The MNR's Director, Forest Management Branch, must approve the use and application of any new information systems (primarily analytical models) used for the purpose of creating information used in the preparation of a forest management plan. Sustainable forest licence holders (plan holders) must seek approval to use any new models for forest management planning purposes prior to their use in plan preparation.

This requirement applies only to information systems which are proposed for use in developing forest management plans which are prepared in accordance with the FMPM. This requirement does not affect information systems created by a company or SFL holder (plan holder) which utilize or maintain forest management planning information to support their implementation of an approved forest management plan or that are created for purposes other than plan preparation, implementation, and reporting.

In proposing the use of new analytical models or other information systems for forest management planning purposes, SFL holders (plan holders) may be required to provide the following information at the request of MNR:

- Demonstration of the model
- Technical hardware, operating system, software or computer system requirements
- Any restrictions on the availability or use of the information system/model or the information used in the information system/model (copyright/proprietary considerations)
- Information requirements including source data
- Process and methodology of preparing data inputs for the information system/model
- Description of the information system/model workings and function in terms of simulation, linear programming or multiple goal programming (optimization)
- Summary of the assumptions required for modelling or processing information
- Sample inputs related to the forest management unit
- Sample outputs related to the forest management unit
- Analysis of model results and explanations which describe how the results were produced and the significance of those results as they pertain to forest management planning
- Other information, explanations, rationale, or source data required by the MNR to determine the applicability and reliability of the new information system (analytical model) for forest management planning purposes

The MNR will consider proposals to use new information systems (analytical models) for forest management planning purposes in a timely manner. The MNR may also determine the conditions and circumstances under which new information systems (analytical models) may be applied in the development of forest management plans. If a proposal to use and apply a new information system (analytical model) is not accepted, the MNR must provide the SFL holders (plan holders) with the rationale for not accepting the model based on the information they provided.

The MNR may establish agreements or arrangements with SFL holders (plan holders) or third parties for the purpose of investigating, assessing, and evaluating new/proposed information systems for the purpose of forest management planning.

6.1.2 Requirements for Information Systems Used for Forest Management Planning

The requirements to apply any specific information system for the purpose of preparing a forest management plan are identified in the FMPM, determined by the planning team (documented in the plan terms of reference), or identified through regional or provincial direction. Once a decision to apply a particular information system has been made, FIM prescribes the requirements to provide information inputs and outputs and to provide access to the applied information systems. As described in Section 1.3 of the FMPM, the terms of reference for a plan must identify as a minimum, "*the analytical models to be used*" and should specify "*who will participate in the analysis of management alternatives and which parts of the task they are responsible for*".

The requirements to develop management alternatives and the analysis of each of those alternatives are described in Section 2.3.4 of the FMPM. From an information perspective, the analysis of management alternatives involves the preparation, analysis, assessment, and evaluation of information used by, and produced from, different information systems (analytical models).

The MNR and the planning team members must have access to all information systems (analytical models) which are used for the purpose of forest management planning, including the analysis of management alternatives. Access to analytical models assures that planning team members, primarily MNR staff and the SFL holders (plan holders), have the ability to utilize the same models and inputs, and are able to replicate the same results, for the purpose of verification and acceptance.

6.1.2.1 *Proprietary Information Systems and Information*

In some cases, information systems and/or information applied in those systems may be proprietary and protected by intellectual property rights or copyright which restrict their distribution and use. While the planning team normally has access to, and the use of, such information and information systems, the planning team must comply with these associated rights and restrictions.

Many of the information systems used in the preparation of forest management plans, as described in this manual, utilize trademarked and copyrighted software products that require licence agreements or arrangements which govern their use and distribution. The implementation of the FIM requirements, which pertain to the use of information systems or information respecting information systems, must comply with such proprietary information rights, intellectual property rights, and copyright mechanisms.

6.1.3 Requirements for Information Produced from Information Systems

The terms of reference for each forest management plan must identify the duties and responsibilities of specific planning team members to prepare data inputs for information systems (analytical models), conduct analyses, and produce information and information products in accordance with the schedule of plan production. The schedule must identify, for each information system, the following responsibilities:

- Who will prepare the input information required for each information system (analytical model)
- The stage in the plan production schedule when the input information will be provided to the planning team members for verification and acceptance
- Who is responsible for reviewing and evaluating the input information
- The stage in the plan production schedule when the information inputs must be verified and accepted
- Who will apply each information system, in terms of conducting the analyses, assessing the results of the analysis, and providing the results to the planning team for decision-making and subsequent inclusion in the plan
- Who is responsible for verification and acceptance of the information system outputs and assessments, and their subsequent inclusion and integration into other information systems and into forest management plan direction and decisions
- The stage in the plan production process when the results produced from the various information systems must be verified and accepted by the appropriate planning team members and the MNR

The MNR must be involved in the verification and acceptance of information prepared for, and produced by, information systems which will be used in forest management planning. The appropriate MNR staff must be identified, along with the appropriate staff representing the SFL holders (plan holders), in the terms of reference for the plan.

Many of the information systems applied in forest management planning require an updated composite planning inventory information product. Sustainable forest licence holders (plan holders) must ensure that an updated FRI is prepared and available for inclusion into the applicable information systems. The MNR must ensure that the updated composite planning inventory information product is verified and is acceptable for use in the various information systems that will be applied in development of a forest management plan, as described in Section 5.3.

The plan terms of reference must identify the critical stages in the schedule of plan production where inputs to the various information systems, and the results generated from those systems, must be verified and accepted by the planning team. The verification and acceptance of the information, and the incorporation of that information into the various analytical models during the development of a plan, normally requires an iterative process. The results produced from one analytical model are often required as inputs to another analytical model or may affect the management considerations or scenarios for a particular management alternative in a previous analysis or analytical model. The schedule of plan production (in the plan terms of reference) must account for the iterative nature and integration of information between dependent information systems. Therefore, it is imperative that planning teams critically review and accept, to the extent possible, the information related to the inputs, assumptions, constraints, and management objectives for each management alternative prior to their initial use. This will ensure that the results produced from one information system are accepted prior to their use in another information system and that the preparation and use of information in the selected information systems does not jeopardize the plan production schedule.

The parties responsible for the different information and information system requirements may not be restricted to planning team members. Other responsible parties may include regional and provincial MNR staff, company-affiliated staff (SFL holders or plan holders) or LCC members. These other responsible parties must be identified in the terms of reference for the plan and are considered to be part of the planning team for those specified purposes.

In accordance with the terms of reference for a plan, the planning team members responsible for utilizing information systems and conducting analysis must also provide the process and methodology for developing model inputs, the inputs themselves, and the outputs. The provision of inputs also includes the management objectives, assumptions, constraints, and other information required to replicate the analysis and results produced with a specific information system. The inputs and the results created from analysis of each management alternative must be documented. The MNR may determine the conditions for documentation as described in Section 6.5.

The requirements for information used in, or created from, the various forest management planning information systems can be grouped into two broad categories: information required for analytical models (as described in Section 6.1.3.1) and information required preparation of forest management planning and reporting tables (as described in Section 6.1.3.2).

6.1.3.1 *Information Required for Analytical Models*

Analytical models are used to manipulate, portray, forecast, simulate, assess, predict, or project information in different ways based on various management alternatives, management objectives, constraints, and assumptions. Analytical models can provide insights into potential change or impacts to different indicators of resource values, and social, environmental, and economic benefits in a temporal and/or spatial context. The results produced from analytical models provide insight, likely trends, and pro-active consideration of how various resource values and benefits may be affected by the proposed management alternatives.

The results produced from modelling and analyses do not provide forest management planning decisions. However, they provide critical rationale to support decisions made in forest management plans. The quality of the rationale is a function of the quality of the model inputs, assumptions, and model function, and the quality of the analyzed/interpreted results.

Many of the analytical models used in forest management planning provide assessments, trend information, and forecast changes with regard to the landbase, forest resources, habitat, landscapes, and other sustainability and resource-based indicators when affected by various forest management planning scenarios. Examples of analytical models applied in forest management planning are:

- Strategic Forest Management Model (SFMM) – used in forest modelling
- Landscape Ecological Analysis Package-2 (LEAP II) – used in landscape pattern and diversity analysis
- Ontario Marten Analyst (OMA) – used to assess the spatial distribution of core marten habitat.
- Ontario Wildlife Habitat Analysis Model (OWHAM) – used in spatial habitat analyses for certain wildlife species
- Ontario Disturbance Agglomeration Model (ODAM) – used to analyze disturbance sizes and spatial distribution
- Socio-Economic Impact Model (SEIM) – used to analyze social and economic impacts of management alternatives

Other analytical tools may be used to prepare information for use with different analytical models such as:

- Strategic Forest Management Model Tool (SFMMTool) – used to classify and aggregate FRI information and prepare inputs for SFMM
- Ontario Wildlife Habitat Analysis Model Tool (OWHAMTool) – used to prepare FRI information, based on habitat supply matrices, for use in OWHAM
- Marten Core Builder (MCB) – used to classify FRI information into core marten habitat areas for use in the OMA model.

The plan terms of reference must identify the analytical models and tools which will be used in the development of the plan. In all cases, the responsible party must provide members of the planning team with the inputs and outputs/results for each analytical model and tool used in forest management planning. The appropriate members of the planning team must be able to reproduce the analysis and results based on the inputs, assumptions, constraints, and management objectives applied.

6.1.3.2 *Information Required To Prepare Forest Management Planning and Reporting Tables*

The MNR utilizes several record management and report generation systems which are used to prepare and maintain information required in specific forest management planning tables, AWSs, compliance reports, annual reports, RPFO, and supplementary documentation.

The requirements for information prescribed in this section pertain to record management and report generation systems in which information must be maintained and provided by SFL holders (plan holders), and in some cases by the MNR.

The MNR has two record management and report generation systems relevant to forest management planning and reporting information: Forest Management Planning Automated Reports Module (FARM) and the Forest Operations Compliance Inspection System (FOCIS). The FARM information system is used to create forest management plan tables, AWS tables, annual report tables, and RPFO tables. The FOCIS information system is used for the preparation of forest compliance inspection reports. Sustainable forest licence holders (plan holders) are not required to use these information systems which are maintained by the MNR. However, SFL holders (plan holders) must provide information required to support and maintain the databases which are used and maintained with the FARM and FOCIS information systems. The MNR will ensure that SFL holders (plan holders) are provided with the FARM and FOCIS information systems.

Sustainable forest licence holders (plan holders), and in some cases the MNR, must provide digital information which is used to produce the forest management plan tables (FMP-1 to FMP-28) as described in the FMPM. The information used to prepare these tables must be compatible with the FARM information system and must be provided in accordance with the conditions described in Section 6.5.

The requirements for digital information used to produce the annual report tables are prescribed in Part D of this manual.

The requirements for digital information required for forest operations compliance inspections and the FOCIS information system, are also prescribed in Part D.

In accordance with the FMPM, the plan author is responsible for tracking, maintaining, and providing records of public consultation with regard to the plan development process, and is required to provide this information as part of the supplementary documentation for the plan to the MNR (the designated MNR planning team member).

6.1.4 Requirements for Source Data, Records and Information, and Processes Used to Create Information Applied in Information Systems

In preparing information required in the various information systems used in forest management planning, access to, or provision of, source data, records and information may be required for the purposes of verifying the information. The source data, records and information may also require processing or manipulation in order to create the input information for the various information systems. Therefore, planning team members and the MNR may also require access to, or provision of, these processes.

The terms of reference for a forest management plan must identify the party responsible for preparing inputs to the various information systems used in planning. Planning teams may require and request access to, or provision of, the source data, records and information, and any processes which were used or applied in the preparation of input information. This information must be provided or made available to the planning team members or the MNR by the responsible party upon request. The MNR may apply various analytical tools such as SFMMTool, OWHAMTool, or the MCB tool for the purpose of verifying how source data or information has been prepared.

Source data, records and information, and processes vary for each information system and the types of data and information available. If the source data, records and information, and/or processes are considered as sensitive or confidential in accordance with FIPPA, the sensitive or confidential information may be restricted for use by planning team members. The source data, records and information, and processes may also be proprietary information, intellectual property or subject to copyright. The planning team members must determine the most effective ways of utilizing the source data, records and information, or processes in respect of sensitive or confidential information, or restrictions on its use, availability, and distribution in regard to proprietary information, intellectual property rights or copyrights.

The party responsible for preparing the source data, records and information, and processes must ensure that planning team members are made aware of the sensitivity or confidentiality of the information. The appointed members of the planning team are considered to be agents of the Crown for the purpose of fulfilling their duties in relation to preparing and implementing a forest management plan. As agents of the Crown, for the purposes of forest management planning and the use and provision of source data, records and information, and processes, members of the planning team are bound by the MNR's obligations under FIPPA. Members of the planning team are also bound by any protocols or agreements that the MNR establishes with other agencies that describe the conditions by which the MNR agrees to use and protect sensitive information which may be used to prepare inputs to information systems.

Examples of sensitive information include:

- Growth and yield information prepared, and paid for, by SFL holders (plan holders)

- Automated computer processes which represent trade secrets or significant investments in processing data
- Data or information about sensitive values and resource features, that if released could threaten the existence, health, or integrity of these values or features (e.g., cultural heritage sites)
- Personal information as defined by FIPPA
- Habitat data or other information related to vulnerable, threatened or endangered species

6.2 Standards For Information in Forest Management Planning Information Systems

The standards for information, which is required for the various analytical models, are described by the appropriate user's guide. The user's guides normally describe the data required to run a particular model, the format of that data, and how the data is normally developed from existing information. For example, the user's guide for SFMM describes how FRI information must be classified, summarized, and formatted.

Some analytical models such as OWHAM and SFMM have separate development tools (OWHAMTool and SFMMTool, respectively) which are dedicated to creating data inputs for their specific models. These tools provide a means of setting standards for information inputs and assumptions used in the various information systems.

6.2.1 Recognized Information Systems Used in Forest Management Planning

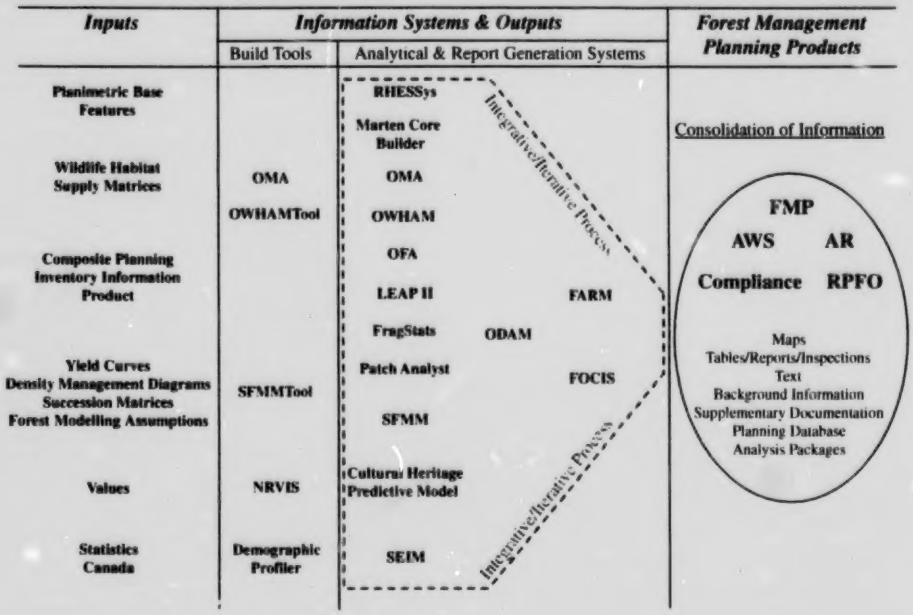
Figure B-21 illustrates many of the recognized and accepted information systems used in forest management planning. Figure B-21 does not contain an all-inclusive list. The information inputs required for the various information systems are identified on the left side and the common analytical build tools, analytical models and report generation systems are shown in the middle. The dashed polygon represents information systems that share information as inputs or outputs. The information outputs and key information products created for forest management purposes are shown on the right side of Figure B-21.

Section 6.2.1.1 provides a brief description of the common and recognized information systems used in forest management planning.

6.2.1.1 *Descriptions of Information Systems Used in Forest Management Planning*

The listing of information systems contained in this section is not an exclusive list as information systems are continually modified or new information systems are created.

Figure B-21 Common Information Systems Applied in Forest Management Planning


Inputs
Information Systems & Outputs
Build Tools
Analytical & Report Generation Systems
Forest Management Planning Products
Planimetric Base Features
Wildlife Habitat Supply Matrices
Composite Planning Inventory Information Product
Yield Curves
Density Management Diagrams
Succession Matrices
Forest Modelling Assumptions
Values
Statistics Canada
OMA
OWHAMTool
SFMMTool
NRVIS
Demographic Profiler
RHESSys
Marten Core Builder
OMA
OWHAM
OFA
LEAP II
FragStats
Patch Analyst
SFMM
Cultural Heritage Predictive Model
SEIM
ODAM
FARM
FOCIS
Integrative/Iterative Process
Integrative/Iterative Process
Consolidation of Information
FMP
AWS
AR
Compliance
RPFO
Maps
Tables/Reports/Inspections
Text
Background Information
Supplementary Documentation
Planning Database
Analysis Packages

Natural Resources and Values Information System (NRVIS) – Record Management and Report Generation System

This system is used by the MNR for the purpose of maintaining information about natural resources and values. The NRVIS information system maintains spatial and tabular information pertaining to point, line, and polygon features and their characteristics. The geographic location and description of these features are considered in AOC planning. Examples of values are: recreational camps, fish spawning areas, stick nests, wetlands, fisheries, etc. The requirements for values information are described in Part B, Section 4.0.

Forest Management Planning Automated Reports Module (FARM) – Record Management and Report Generation System

The FARM information system maintains information used to create plan forecast and operations summary tables, AWS tables, annual reporting tables and RPFO tables as described in the FMPM.

Forest Operations Compliance Inspection System (FOCIS) – Record Management and Report Generation System

The FOCIS system tracks information collected from individual compliance inspections of forest operations. Instances of non-compliance and the significance of infractions related to forest operations are maintained as part of this information system. The requirements for forest operations compliance inspection reporting are described in Part D, Section 5.0.

Strategic Forest Management Model (SFMM) – Analytical Model

The SFMM model is used to analyze the long-term effects of different management scenarios on forest conditions and management objectives. The inputs to this analytical model are the FRI (planning inventory), yield curves, forest succession information, wildlife habitat suitability, silvicultural options, and management targets, strategies, and constraints. The outputs provide projections of the available harvest area, wildlife habitat, wood supply, silvicultural expenditures, forest age class, and land base changes.

Strategic Forest Management Model Tool (SFMMTool) – Analytical Tool

SFMMTool is a data preparation tool which converts FRI (planning inventory) information into a suitable format for the SFMM and Patch Analyst analytical models. This tool assists users with classifying forest stand description information into forest units, wildlife habitat units and habitat suitability tables, and age classes, and also generate land base summaries and yield curves.

Landscape Pattern Analysis Package – 2 (LEAP II) – Analytical Tool

LEAP II utilizes spatial FRI (planning inventory) information and determines landscape pattern indices and forest diversity indices to express variation in forest structure, composition, and spatial pattern distribution. This tool provides landscape measures (indicators) of core areas, mean patch size, edge density, age class structure diversity, etc.

Patch Analyst – Analytical Model

Patch Analyst also utilizes spatial FRI (planning inventory) information. Patch Analyst is similar in function to LEAP II and produces similar indices of landscape diversity and forest structure.

Fragstats – Analytical Tool

Fragstats is a public domain program that provides the mathematics for calculating landscape diversity and forest structure indices. Fragstats provides mathematical calculations and relationships which are incorporated into analytical models, such as LEAP II and Patch Analyst.

Ontario Wildlife Habitat Analysis Model (OWHAM) – Analytical Model

The OWHAM analytical model utilizes FRI (planning inventory) information and regional habitat suitability matrices to determine the spatial distribution of habitat for moose, deer, pine marten, red-shouldered hawk, and pileated woodpecker.

Ontario Wildlife Habitat Analysis Model Tool (OWHAMTool) – Analytical Tool

OWHAMTool uses tabular FRI (planning inventory) information and prepares inputs used in the OWHAM analytical model.

Ontario Marten Analyst (OMA) – Analytical Tool/Model

The OMA is both an analytical tool and a model which is used to classify potential and suitable marten habitat (now and in the future) based on the current FRI (planning inventory) condition and the forecasted changes to the FRI.

Ontario Forest Analyst (OFA) – Analytical Model

The OFA analytical model is used to classify capable and suitable caribou habitat and create caribou mosaics using the current FRI (planning inventory) condition and the forecasted changes to the FRI.

Marten Core Builder (MCB) – Analytical Model

The MCB is an analytical model used to create core marten habitat areas and associated statistics for use in the OMA analytical model.

Regional Hydro Ecological Simulation System (RHESSys) – Analytical Model

The RHESSys analytical model provides landscape level estimates for carbon and water cycling indicators of net primary productivity and hydrology. The RHESSys analyses are conducted by the MNR on a provincial basis and the results are provided to planning teams as background information.

Socio-Economic Impact Model (SEIM) – Analytical Model

The SEIM model is a proprietary model licenced for use by the MNR only. The SEIM analytical model utilizes wood supply forecasts produced from the analysis of management alternatives from the SFMM analytical model. The outputs from this model provide socio-economic indictors such as jobs, salary and wages, value added, and housing prices for the various industry sectors and pre-defined geographic areas (provincial, MNR administrative regions and districts).

Demographic Profiler – Analytical Tool

The Demographic Profiler analytical tool analyzes Statistics Canada information and census data to provide community and industry sector-based profiles for each MNR administrative district. The district demographic profiles are provided to planning teams by the MNR.

Ontario Cultural Heritage Predictive Model – Analytical Model

The Ontario Cultural Heritage Predictive Model provides the spatial locations of candidate high-potential cultural heritage areas for which further investigation is required to confirm and verify that predicted candidate areas will be identified and treated as values. The MNR is responsible for applying this model and providing the confirmed results to planning teams. The MNR is also responsible for calibrating the model. The requirements for this analytical model are further described in Section 4.0.

Ontario Disturbance Agglomeration Modeller (ODAM) – Analytical Model

The ODAM model amalgamates groups of disturbances, such as clear-cuts and wildfires, based on the frequency, size, and distribution (distance between disturbances). The ODAM model provides a summary of landscape disturbance patterns in terms of their size class and distribution.

If the analytical tools are not used to create data inputs for their associated analytical models, the data created for a particular model may be verified by the MNR using these data input development tools.

6.3 Roles and Responsibilities for Information in Forest Management Planning Information Systems

The appropriate planning team members, as identified in the terms of reference for a forest management plan, are responsible for verifying the accuracy of the information prepared for, and used in, information systems that are applied in forest management planning. The MNR is also responsible for reviewing and approving information which is applied in and created by information systems which are used to support the development of forest management plans. This responsibility is part of the plan review and approval processes.

For the purpose of verification and approval of information used in information systems, planning team members or the MNR may request the source data, records and information, and processes, which were used to prepare inputs and assumptions. The MNR and SFL holders (plan holders) must ensure that members of the planning team have access to the information systems used in forest management planning for verification and review purposes.

The planning team members and the author of the forest management plan must ensure that the terms of reference for the plan contains the plan schedule details, responsibilities, and timeframes required to; prepare, verify, and accept information used information systems, and apply those information systems during plan development. The MNR District Manager and the MNR Regional Director responsible for approving the plan terms of reference must ensure that sufficient details are identified regarding the requirements for information and information systems which will be applied in the development of the forest management plan.

All information which has been prepared and created for the purpose of forest management planning must be provided with the draft plan submission and archived by both the SFL holder (plan holder) and the MNR. The archived information must remain retrievable for the life and duration of the forest management plan, as well as for preparation of the appropriate RPFOs.

6.4 Timelines for Information in Forest Management Plan Information Systems

The inputs and outputs/results from the information systems used in forest management planning must be developed in accordance with the schedule of plan production as described in the plan terms of reference. In most cases, the inputs and assumptions created for information systems must be reviewed and accepted by members of the planning team prior to their application.

The plan terms of reference must identify the timelines for the provision of information prepared for each information system (inputs) and the results generated by each information system (outputs). These timelines will vary depending on the integrated and iterative nature of the information systems chosen to support the preparation of a forest management plan.

Critical timelines for certain information, which has been prepared by the planning team, should be consistent with the public consultation process and the schedule of plan production. The final versions of information which have been prepared for, and generated from, information systems must be submitted with the draft plan and/or the revised plan.

6.4.1 First Date of Effect for Provision of Information Used in Forest Management Planning Information Systems

All information prescribed in Section 6.0 must be provided as of the date of implementation of the FIM for forest management plans which have not yet been approved by the MNR.

6.5 Conditions for Information in Forest Management Planning Information Systems

The conditions for provision of information used in the information systems will be met when the inputs can be applied in the applicable information system and the outputs/results can be duplicated. Duplication of the results requires the provision of the inputs and the applied assumptions, constraints, objectives, conditions, management alternatives, objectives, and strategies, or any other information required to reproduce the results or analysis produced from an information system.

The user's guides and associated technical reports describe the formats of the information (inputs and outputs) required for each information system and how analyses are conducted. These user's guides serve as the technical specifications for the provision of information prescribed in Section 6.0.

All information systems which are used for the development of a forest management plan must be identified in the terms of reference for the plan and may only be used when the plan terms of reference are approved. Where information systems are used which differ from the information systems used by the MNR, the information must be provided in a format that is compatible with the information systems used by the MNR.

For example, if an SFL holder (plan holder) applied an analytical tool (as approved in the terms of reference for the plan) which uses similar information and produces similar results to the SFMM, the SFL holder (plan holder) must provide information that can be imported and applied in the SFMM model. The MNR must ensure that inputs and results for the similar information system can be verified using the recognized information system applied by the MNR. Verification in this case requires that the same conclusions, trends, observations, and forest management planning decisions can be derived from the information and information systems used by the SFL holder (plan holder).

6.5.1 Analysis Packages

The MNR may develop provincial or regional requirements for the purpose of documenting information used in specific information systems. The requirements for documentation will be identified in Analysis Packages, which may be prepared for specific information systems or analytical requirements.

The documentation requirements identified in the analysis packages may identify the records and information to be maintained by the planning team for each information system, such as:

- source data, records, and information
- records and other information
- input generation processes
- inputs
- management alternatives, management scenarios
- management objectives, strategies and targets
- constraints, assumptions
- results
- analysis and assessment of results
- linkages and integration of inputs and results with other information systems
- sensitivity analysis
- other documentation for information related to the inputs, results, and analysis of management alternatives and integration with other information systems

6.5.2 Information Conditions for Forest Management Planning Automated Reports Module

The digital information required to prepare the forest management plan tables FMP–1 to FMP-28 in accordance with the FMPM must be provided in a format as prescribed by the *Technical Specifications for Providing Forest Management Planning Automated Reports Module Information*.

6.5.3 Information Conditions for Public Consultation Information

The MNR will consult with the plan author to determine the most efficient and cost-effective means of providing information and records with regard to the public consultation process.

PART C

INFORMATION AND INFORMATION PRODUCTS FOR ANNUAL OPERATIONS

1.0 INTRODUCTION

Part C of the Forest Information Manual (FIM) identifies the information requirements for annual planning of forest operations, as described in Part B of the Forest Management Planning Manual (FMPM). The information requirements are related to the development of forest operations prescriptions (see Section 2.0) and to the production of an annual work schedule (AWS) (see Section 3.0).

The FMPM also describes the project planning information requirements for three types of forest operations for which detailed project planning and approval is required prior to their implementation; prescribed burning, aerial application of a herbicide or insecticide, and insect pest management (Part B, Sections 4.0, 5.0, and 6.0, respectively). The FMPM requires these operations to be listed in the AWS and their associated project descriptions, project plans, and/or operational plans to be included in, or appended to, the AWS. The FIM requires that sustainable forest licence (SFL) holders (plan holders) and the Ministry of Natural Resources (MNR) provide each other with the information required in a project plan for prescribed burns, aerial herbicide or insecticide applications, and insect pest management programs as described in the FMPM and the applicable operational manuals and guidelines.

2.0 INFORMATION FOR FOREST OPERATIONS PRESCRIPTIONS

As defined in Part B, Section 2.0 of the FMPM, a forest operations prescription is a site specific, integrated set of harvest, renewal, and maintenance activities. A forest operations prescription provides a record of the detailed operational activities and conditions that will be applied to specific sites and provides documented details related to the planning and implementation of specific operations and treatments as part of a silvicultural treatment package (or regime of applied treatments).

Forest operations prescriptions must be developed before any operations can commence on a particular site and involve the confirmation or verification of the description of the site conditions (i.e., site type/ecosite) and confirmation of the preferred silvicultural treatment package. If the site description is not correct, an acceptable alternative silvicultural treatment package for the actual site type/ecosite must be selected from an approved forest management plan (based on Table FMP-10 – Silvicultural Ground Rules).

2.1 Requirements for Forest Operations Prescriptions Information

Section 42(1) of the Crown Forest Sustainability Act (CFSA) identifies the requirement to prepare a forest operations prescription prior to conducting forest operations. The FMPM, Part B, Section 2.0, requires the development and certification of forest operations prescriptions as part of the planning and implementation of annual forest operations. The information requirements for forest operations prescriptions, as prescribed in this section, also apply to prescriptions for Areas of Concern.

The results of confirming and verifying forest unit/site type description information and site type conditions, and selecting the silvicultural treatment package for each site, are identified in the AWS, or are appended to the AWS, as each forest operations prescription is certified by a Registered Professional Forester. The records and information related to forest operations prescriptions for each site are compiled over time and maintained over the life cycle of a forest stand.

Sustainable forest licence holders (plan holders) are required to maintain records and information related to forest operations prescriptions and silvicultural activities for all forest stands/sites in a progressive and traceable manner. This requires the tracking of the original silvicultural ground rule, silvicultural treatment, and forest operations prescription which was prepared and applied to each specific site through to the most recent silvicultural ground rule, silvicultural treatment, and forest operations prescription for those sites. This also requires that all changes to silvicultural ground rules, silvicultural treatments (packages) and forest operations prescriptions are documented and are traceable for each forest stand/site over time.

The tracking of silvicultural activities includes the following information:

- The original approved forest management plan and all subsequent plans containing the silvicultural ground rules which have been applied to each working group or forest unit/site type combination.
- The original silvicultural ground rule and any subsequent silvicultural ground rules which were applied or that currently apply for each working group, or each forest unit/site type combination.
- The silvicultural treatments or silvicultural treatment packages which describe the regime of silvicultural activities that have been applied to working groups or forest units/site type combinations for each silvicultural ground rule that has been applied or that is currently being applied to a specific site.
- The sequence of individual treatments that have been applied to a specific site. The sequence begins with the original plan, silvicultural ground rule, and silvicultural treatments or treatment packages and continues to the current plan, silvicultural ground rule, silvicultural treatment package, and forest operations prescription. This includes any changes to the AWS resulting from the verification of the working group or forest unit/site type description information, or the selected silvicultural treatment package and certification of forest operations prescriptions.

The traceability of silvicultural records and activities information for a given area (a site or a forest stand) must be maintained by SFL holders (plan holders) as part of their information records. This information must be maintained on a forest stand basis so that the regime of silvicultural treatments that have been applied to a specific forest stand or site can be tracked over time, regardless of whether the forest stand identity (stand number or label) has changed or not.

Therefore, the forest operations prescription provides a continuous and traceable record of previous treatments that have been applied to a specific site, from the original treatment to the most recent treatment, and may also include the next treatment that will be applied to the site, if identified in an AWS.

Sustainable forest licence holders (plan holders) are not normally required to provide all the information maintained in complete forest operations prescriptions or the information related to the tracking of silvicultural treatments and forest operations prescriptions to the MNR as part of the AWS submission. However, the MNR may require access to, or provision of, information about specific forest operations prescription(s) for the purposes of monitoring and auditing (including compliance activities conducted by the MNR) forest operations conducted on a specific site.

The MNR may also require access to, or provision of, information about specific tree marking prescription(s) for the purposes of tree marking auditing, and/or for the purposes of monitoring and auditing forest operations in relation to a forest operations prescription. A tree marking prescription is considered to be an extension to a forest operations prescription, and therefore may be considered as part of the information required for auditing and monitoring of forest operations.

Similar to requests for forest operations prescriptions information, the MNR may request the silvicultural tracking information related to a specific forest area or site for the purpose of auditing or monitoring the progression of forest management activities, and verification of annual report information, Report of Past Forest Operations (RPFO), silvicultural effectiveness, and forest resources inventory updates.

In all requests for forest operations prescription and/or marking prescription information, and silvicultural tracking information, the MNR must provide the SFL holders (plan holders) with the reason for requiring the information along with sufficient notice prior to requiring access to, or provision of, the information. Sustainable forest licence holders (plan holders) must allow access to, or provision of, the requested forest operations prescription information and related records.

Sustainable forest licence holders (plan holders) may maintain and manage information and records pertaining to forest operations prescriptions or silvicultural tracking of forest operations prescriptions in any format, providing they can fulfill the information requirements described in this section.

2.2 Standards for Forest Operations Prescriptions Information

Sustainable forest licence holders (plan holders) must maintain information and records related to forest operations prescriptions, and the silvicultural tracking of that information, such that forest operations prescriptions can be directly linked to the following information and information products:

- stand listings information contained in the forest management plan, AWS, and annual reports;
- forest stand level information provided on operational scale maps, and linkages with forest management activities applied on an operating block basis;
- information summaries of annual report and RPFO information by forest unit/site type combination;
- updates to past and present forest resources inventory (stewardship inventory and planning inventory); and,
- past and present forest management plans, silvicultural ground rules, changes in forest units, working groups, silvicultural treatment packages, and other information related to silvicultural strategies.

The document entitled Silvicultural Effectiveness Monitoring Manual for Ontario provides further guidance regarding the linkages between silvicultural objective setting, assessing the effectiveness of silvicultural treatments and forest operations prescriptions, and tracking and reporting of silvicultural effectiveness monitoring at the site, forest, management unit, and provincial levels. Part D, Section 4.0 of the FIM prescribes the requirements for silvicultural effectiveness monitoring survey information.

2.3 Roles and Responsibilities for Providing Forest Operations Prescriptions Information

Sustainable forest licence holders (plan holders) are responsible for ensuring that forest operations prescriptions are accurately referenced in the AWS, and that the information and records pertaining to forest operations prescriptions, and the silvicultural tracking of those prescriptions, is maintained and updated on a regular basis.

Sustainable forest licence holders (plan holders) must also maintain source data, records, and information related to the certification of forest operations prescriptions, such as aerial photography, maps, surveys, inspections, cruises, samples, or other data collected and used as part of the verification and certification of site type conditions and the selection of silvicultural treatment packages.

In some cases, the MNR may request access to, or provision of, the source data, records, and information as part of the request for forest operations prescription information, tree marking prescription information, or information related to the silvicultural tracking of treatments. The MNR will respect the intellectual property rights of this source information and will treat the source data, records, and information in accordance with the direction provided in Part A, Section 1.4.2.

2.4 Timelines for Providing Forest Operations Prescriptions Information

The MNR will normally provide SFL holders (plan holders) with a notice period of ten working days when making a request for specific forest operations prescription and/or tree marking prescription information. Sustainable forest licence holders (plan holders) must normally provide the required information within ten working days of the request.

If the request for information is related to a forest operations compliance inspection, however, the MNR may make requests for access to, or provision of, forest operations prescriptions, in accordance with the Forest Compliance Handbook or an approved company and/or MNR district compliance plan.

In the case of any discrepancies in the timelines normally required to provide such information, SFL holders (plan holders) and the MNR will consult on the issues and the nature of the request. The MNR will consider the consultation and provide the SFL holders (plan holders) with a decision respecting the timelines for the required information.

2.5 Conditions for Providing Forest Operations Prescriptions Information

In the case of a request for information made by the MNR regarding the provision of forest operations prescription information, tree marking prescription information, or the tracking of silvicultural treatments, the MNR must consult with SFL holders (plan holders) to jointly determine the format for provision of the required information in the most efficient and cost-effective manner.

3.0 INFORMATION FOR ANNUAL WORK SCHEDULES

Sustainable forest licence holders (plan holders) are required to provide the information as described in Part B, Section 3.0 of the FMPM for the preparation and submission of the AWS.

The MNR may make requests for access to, or provision of, information related to the content and/or preparation of the AWS from SFL holders (plan holders). Information requests may be specific to certain scheduled operations or may be related to summary information contained in an AWS. The MNR will consult with SFL holders (plan holders) to determine the timelines and the most efficient and cost-effective manner to provide access to, or provision of, the information.

PART D INFORMATION AND INFORMATION PRODUCTS FOR MONITORING, REPORTING, AND EVALUATION

1.0 INTRODUCTION

Part D identifies the requirements for information in annual reports, silvicultural effectiveness monitoring surveys, and forest operations inspection reports. This information is required annually, and is based on forest management activities which have been conducted in accordance with an approved forest management plan and natural changes which have occurred during a fiscal year of operations (reporting period).

Sections 2.0 and 3.0 identify the information required to support the production of annual reports and, in particular, annual report tables, in accordance with Part C, Section 3.0 of the *Forest Management Planning Manual* (FMPM). These sections also identify information requirements for annual reporting tables that are in addition to those described in the FMPM. These additional requirements support the legal requirements and intent of the FMPM and the Terms and Conditions (T & C) of the Environmental Assessment (EA) Board's Decision on the Ministry of Natural Resources' (MNR) *Class Environmental Assessment for Timber Management on Crown Lands in Ontario* (Timber Class EA). These sections also prescribe the requirements to prepare and provide spatial information which identifies forest management activities and natural changes that have occurred on the forest management unit during the reporting period.

Section 4.0 identifies the requirements to conduct silvicultural effectiveness monitoring surveys in accordance with the *Silvicultural Effectiveness Monitoring Manual for Ontario* (SEMMO). This section also describes the requirements to collect and maintain a mandatory subset of information (results) from silvicultural effectiveness monitoring surveys, and the requirements to utilize and incorporate these results when updating the stewardship inventory and/or planning inventory information, as described in Part B, Section 5.0.

Section 5.0 describes the requirements to provide information collected from forest operations inspections in accordance with the *Forest Compliance Handbook*, the *Guideline for Forest Industry Compliance Planning*, and the Forest Operations Compliance Information System (FOCIS). The requirements for digital forest operations inspection report information are based on the frequency, timing, and intensity of inspections and actions, as described in Company Compliance Plans and MNR District Compliance Plans.

2.0 ANNUAL REPORT TABULAR INFORMATION

Part C, Section 3.0 of the FMPM states that:

> *"For each forest management unit, a report must be prepared annually to summarize the forest management operations which were carried out during the preceding year. Annual reports are prepared for a 12-month period, which normally commences April 1st and ends March 31st".*

Part C, Section 3.2 of the FMPM also states that the annual report is a combination of tabular, map, and text information.

The requirements described in this section of the *Forest Information Manual* (FIM) pertain to the provision of digital information needed to create annual report tables as described in the FMPM. This section also identifies additional tabular information which is required to meet the intent of, and supplement, the current requirements in the FMPM, or are required to meet the T & Cs of the Timber EA. The spatial information requirements for annual forest management activities and natural changes are described in Section 3.0. The tabular information required in this section must be consistent and supported by the spatial information requirements described in Section 3.0.

The annual report information described in these sections is one of the most important sources of information used to update forest resources inventory (FRI) information (stewardship inventory and planning inventory information). Sustainable forest licence holders (SFL) (plan holders) must utilize the annual report information prescribed in these sections when updating FRI information.

Some of the additional annual report tabular information requirements described in this section are based on changes in forest management planning responsibilities that have occurred since the implementation of the FMPM. For example, the responsibility to conduct forest operations compliance inspections has been transferred to SFL holders (plan holders). The MNR maintains monitoring, auditing, and compliance assessment responsibilities. This transfer in responsibility necessitates a change to the information required for annual reporting from both SFL holders (plan holders) and the MNR as described in this section.

2.1 Requirements for Annual Report Tabular Information

Sustainable forest licence holders (plan holders) must provide the information needed to create the annual report tables described in the FMPM, along with the additional information needed to create supplemental tables, as prescribed by the FIM, which are also required for forest management planning purposes. The tabular information requirements for all annual report tables are described in this section.

Sustainable forest licence holders (plan holders) and, in some cases, the MNR must provide a copy of the digital information which is required to create the following annual report tables:

AR-1	Annual Report of Depletion Area
AR-2	Annual Report of Planned Harvest Area by Licensee
AR-3	Annual Report of Wood Utilization by Licensee
AR-4	Annual Report of Volume Associated with Natural Depletions
AR-5	Annual Report of Wood Utilization by Mill
AR-6*	Annual Report of Renewal, Tending and Protection Operations (Total)
AR-6a*	Annual Report of Renewal, Tending and Protection Operations (Harvest)
AR-6b*	Annual Report of Renewal, Tending and Protection Operations (Natural Depletions)
AR-6.1*	Annual Report of Quantities of Stock and Tree Seed Used in Renewal Activities
AR-6.2*	Annual Report of Quantities of Tree Seed Collected
AR-7	Annual Report of Assessment of Regeneration Success (Total)
AR-7a*	Annual Report of Assessment of Regeneration Success (Harvest)
AR-7b*	Annual Report of Assessment of Regeneration Success (Natural Depletions)
AR-8.0	Annual Report of Harvest and Projected Regeneration
AR-8.1*	Annual Report of Natural Depletions and Projected Regeneration
AR-9	Annual Report of Regeneration Success (Total)
AR-9a*	Annual Report of Regeneration Success (Harvest)
AR-9b*	Annual Report of Regeneration Success (Natural Depletions)
AR-10*	Annual Report of Primary and Secondary Road Construction and Use Management
AR-11*	Annual Report of Revenues and Expenditures
AR-12*	Annual Report of Forest Operations Inspections
AR-12.1*	Annual Report of Forest Operations Inspections Conducted by the Sustainable Forest Licence Holder (Plan Holder)
AR-12.2*	Annual Report of Compliance Inspections and Actions Taken by the MNR
AR-13*	Annual Pesticides Summary Report

The information requirements for the annual report tables which are marked with an asterisk (*) have been modified or are in addition to the annual report tables described in the FMPM. The FIM reflects the updated information requirements for all annual report tables. The annual report tables which are not marked have not been modified and, therefore, the information described in the FMPM for these tables must be provided in digital form as described by the FIM.

The MNR must provide information to complete the volume summaries required in Tables AR-3 and AR-5, the expenditures portion of Table AR-11, and all of the information required in Tables AR-12.1 and AR-12.2. Sustainable forest licence holders (plan holders) must provide information for all other annual report tables.

The information changes or additions which have been made to each of the annual report tables are described by the standards in Section 2.2. Consistent with the requirements for annual reports described in Part C, Section 3.2 of the FMPM, the text of the annual report must include explanations of significant differences from annual work schedule (AWS) activities, emerging trends and issues, and sources of information used to prepare annual report tabular information. This requirement also applies to the changed and additional information, as prescribed in this section.

The information described in these tables must be provided in digital form, in accordance with the timelines identified in Section 2.4 and the conditions described in Section 2.5. As identified in Section 2.5, digital information must be provided in a specified format for inclusion in the information databases which are maintained in the Forest Management Planning and Automated Reports Module (FARM) information system, or its successor. Sustainable forest licence holders (plan holders) are not required to utilize the FARM information system, but may use it for the purpose of creating and providing the required annual report information.

In some cases, SFL holders (plan holders) may be required to provide the source data, records, and information which were used to create the required annual report tabular information. The MNR may request access to, or provision of, source data, records, and information for the purpose of reviewing the annual report for completeness and verifying the accuracy of the information provided. The MNR must comply with the *Freedom of Information and Protection of Privacy Act* (FIPPA), and will respect the intellectual property rights of SFL holders (plan holders) regarding the use of source data, records, and information which are provided for this purpose. In other cases, the MNR may request other records and information from SFL holders (plan holders) for the purpose of checking and verifying the annual report information. These roles and responsibilities are further described in Section 2.3.

2.2 Standards for Annual Report Tabular Information

This section describes the changes and additions that have been made to the annual report tables and the corresponding information. The standards for annual report tabular information which have not changed are referenced and described in Part C, Section 3.2 of the FMPM. The technical standards for providing the annual report tabular information are outlined in the *Technical Specifications for Providing Forest Management Planning and Reporting Information*, as prescribed by the conditions in Section 2.5. Further guidance related to the preparation and review of annual reports is available in the *Annual Report Preparation and Review Protocol*.

2.2.1 Interpretation, Changes, and Additions to Annual Report Tabular Information

A listing of the annual report tables is provided along with the standards for the tabular information that is required in each table. These standards identify three categories of information: no changes, supplemental interpretation, and additional information.

In cases, where there are *no changes* to the basic information requirements for a particular table, the standards that describe the information required for those annual report tables are referenced in Part C, Section 3.2 of the FMPM.

Where the standards provide clarification of the information required in a specific annual report table they are described under *Supplemental Interpretation*. Where the standards describe new information requirements in existing tables or new tables, these standards are described under *Additional Information*.

AR-1 Annual Report of Depletion Area

There are no changes to information required in this table.

Supplemental Interpretation

Tending

Non-commercial improvement cuts are not recorded in Table AR-1 and must be recorded and provided in Table AR-6 as a tending treatment.

Depletion Area (hectares) – Harvest

The Depletion Area – Harvest information includes area for both normal and modified harvest operation types.

Natural

On an annual basis, the MNR must provide SFL holders (plan holders) with the gross areas affected by fire, insects, and other natural disturbances as collected by the MNR's fire program and in cooperation with the Canadian Forest Service as documented in the *Forest Health Conditions in Ontario* report. The MNR will provide SFL holders (plan holders) with spatial coverages, in digital form, of the natural disturbance areas that will identify the natural disturbance type and the geographical extent of the area affected by the disturbance. The MNR will ensure that this information is provided at least two months prior to the SFL holder's (plan author's) timeline to submit the annual report as described in Section 2.4.

The gross areas affected by natural disturbances such as fire, insects and disease provide SFL holders (plan holders) with preliminary areas from which further investigation is required to identify the actual net depleted areas. SFL holders (plan holders) must confirm and report the actual net area depleted by natural causes.

AR-2 Annual Report of Planned Harvest Area By Licensee

There are no changes to the information required in this table.

Supplemental Interpretation

Harvest Area (hectares)

The harvest area information includes the area for both normal and modified harvest operation types.

AR-3 Annual Report of Wood Utilization By Licensee

There are no changes to the information required in this table.

Supplemental Interpretation

The volume information which is required by species within this table is maintained as part of the MNR's corporate Timber Resources Evaluation System (TREES). This information system tracks the volumes of wood harvested from Crown lands by licensee, and is the basis for determining dues/stumpage owed to the Crown. The information maintained in the TREES information system is treated as confidential, with the exception of the volumes utilized by species. The volume information represents the total volumes utilized, which include merchantable, non-merchantable, and undersized volume. The MNR will ensure that information about wood utilization volume by species is provided to appropriate SFL holders (plan holders) two months prior to the SFL holder's (plan holder's) timeline to submit the annual report as described in Section 2.4.

Sustainable forest licence holders (plan holders) must verify the accuracy of the volume information provided by the MNR, and rectify any discrepancies with the MNR prior to submitting their annual report.

AR-4 Annual Report of Volume Associated with Natural Depletions

There are no changes to the information required in this table.

Supplemental Interpretation

On an annual basis, the MNR must provide SFL holders (plan holders) with spatial coverages which identify the gross areas affected by fire, insects, disease, and other natural disturbances, as described for Table AR-1.

The gross areas affected by natural disturbances such as fire, insects and disease provides SFL holders (plan holders) with a preliminary area from which further investigation is required to identify the actual net depleted areas and estimate the associated volume losses which have occurred. SFL holders (plan holders) must confirm and report the actual net area depleted by natural causes, and must estimate the associated volume of timber depleted for each natural depletion type. The MNR may also provide SFL holders (plan holders) with estimates of volumes of merchantable timber depleted from natural disturbances and the process or methodology which was used to determine those estimates.

AR-5 Annual Report of Wood Utilization by Mill

There are no changes to the information required in this table.

Supplemental Interpretation

Similar to Table AR-3, the volume information which is required by species for this table is maintained as part of TREES information system. The MNR will ensure that information pertaining to volume of wood by species which is utilized in mills is provided to the appropriate SFL holders (plan holders) two months prior to the SFL holder's (plan holder's) timeline to submit the annual report as described in Section 2.4.

SFL holders (plan holders) must verify the accuracy of the volume information provided by the MNR, and rectify any discrepancies with the MNR prior to submitting their annual report.

AR-6 Annual Report of Renewal, Tending and Protection Operations

Supplemental Interpretation

Prescribed Burn

A prescribed burn can be considered as either a site preparation activity or a tending activity. However, for annual reporting purposes, the prescribed burn area should not be double-counted. Prescribed burn area must be reported as one silvicultural treatment activity only.

Additional Information

Site Preparation

Site preparation includes three types of activities: mechanical, chemical, and prescribed burn. Slash pile burning is considered to be a form of prescribed burning and requires a post burn report in accordance with Part B, Section 4.0 of the FMPM and the *Prescribed Burn Planning Manual*. The area identified in the post burn report should match the area identified in Table AR-6. Slash pile burn area should not be included with regular prescribed burn area reported in the Prescribed Burn row. Slash pile burn area information, as recorded in the slash pile burn row of Table AR-6, must be provided and explained in the accompanying text of the annual report.

Two additional tables have been added to differentiate between renewed, tended, and protected areas which were depleted by natural causes and areas which were depleted by harvest. These additional information requirements have been added for the purpose of tracking and summarizing renewal activities by the manner in which the areas were depleted (area harvested versus area naturally depleted). Sustainable forest licence holders (plan holders) must provide information for three separate versions of the Annual Report of Renewal, Tending, and Protection Operations table:

• Table AR-6	Report of Total Area (harvested + natural depleted and salvage)
• Table AR-6a	Report of Harvested Areas Only
• Table AR-6b	Report of Natural Depleted Areas (includes salvage operations)

The information required for these three tables is identified in Tables AR-6, AR-6a and Table AR-6b respectively. The basic descriptions of the information required for Table AR-6 in Part C, Section 3.2 of the FMPM also apply to the information required in Tables AR-6a and AR-6b. Information related to salvage treatments must be included as part of the natural depletion report information required in Table AR-6b and must also correspond with the salvage area information provided in Table AR-1.

The separation of total areas that have been treated and successfully regenerated into areas harvested versus areas naturally depleted provides a more direct comparison to forest management plan objectives and strategies which determine area to be harvested and regenerated. This information also provides a better indicator of sustainable forest management for both harvested areas and naturally regenerated areas.

In each of the three tables, two additional sections have been added to the information requirements: retreatments and supplemental. These additional sections are identified by the dashed rectangles in Tables AR-6, AR-6a and AR-6b. There are instances where an area, that has received an initial regeneration treatment, may require further assistance or an additional regeneration treatment to all or part of the originally treated area to achieve the regeneration standards for a site. Some examples include retreatment of failures, changing regeneration prescriptions, and natural regeneration prescriptions that may include supplemental planting. In these instances, SFL holders (plan holders) must provide information to identify the applicable retreatment or supplemental treatment areas.

Retreatments

A retreatment is a specific treatment within the selected silvicultural treatment package which has been applied a second time. Retreatments are variations of the original silvicultural treatment package that are applied to bring a productive forest area to a free-growing condition based on the regeneration standards and expected future forest conditions as described by the silvicultural ground rules in an approved forest management plan. Retreatments are usually applied after a preliminary assessment (silvicultural effectiveness monitoring survey) has been conducted, and the planning forester has determined that further treatment is required to achieve the regeneration standards for a site based on the results of the assessment/survey.

Table AR-6

MANAGEMENT UNIT NAME:________________
PLAN TERM:__________**TO**______________
ANNUAL REPORT:__________**TO**____________

■ **Total**
☐ **Harvest**
☐ **Natural Depletion (includes salvage)**

AR-6 ANNUAL REPORT OF RENEWAL, TENDING AND PROTECTION OPERATIONS

	Area by Future Forest Unit (ha)								
	<Future Forest Unit>			<Future Forest Unit>			Total		
	Current	To Date	Balance	Current	To Date	Balance	Current	To Date	Balance
Renewal									
Regeneration									
Uneven-Aged Management									
Selection Cut - Harvest									
Total Uneven-Aged Management									
Even-Aged Management									
Natural Regeneration									
Clearcut									
Strip Cut									
Seed Tree Cut									
Uniform Shelterwood Seed Cut									
Subtotal Natural									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Subtotal Artificial									
Total Uneven-Aged Management									
Total Regeneration									
Site Preparation									
Mechanical									
Chemical									
Prescribed Burn - conventional									
- slash pile burn									
Total Site Preparation									
Tending									
Cleaning									
manual									
chemical - ground									
- aerial									
mechanical									
prescribed burn									
Spacing, pre-commercial thinning, improvement cutting									
even-aged									
uneven-aged									
Cultivation									
Pruning									
Total Tending									
Protection (Insect Pest Control)									
accelerated harvest									
salvage									
manual protection (Seed Orchard)									
ground insecticide									
aerial insecticide									
Total Protection									
Retreatment									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Total Re-treatment									
Supplemental									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Total Supplemental Treatments									

Table AR-6a

MANAGEMENT UNIT NAME:________________
PLAN TERM:__________TO______________
ANNUAL REPORT:_________TO___________

☐ Total
☒ Harvest
☐ Natural Depletion (includes salvage)

AR-6a ANNUAL REPORT OF RENEWAL, TENDING AND PROTECTION OPERATIONS

	Area by Future Forest Unit (ha)								
	<Future Forest Unit>			<Future Forest Unit>			Total		
	Current	To Date	Balance	Current	To Date	Balance	Current	To Date	Balance
Renewal									
Regeneration									
Uneven-Aged Management									
Selection Cut - Harvest									
Total Uneven-Aged Management									
Even-Aged Management									
***Natural* Regeneration**									
Clearcut									
Strip Cut									
Seed Tree Cut									
Uniform Shelterwood Seed Cut									
Subtotal Natural									
***Artificial* Regeneration**									
Planting									
Seeding direct									
with site preparation									
Scarification									
Subtotal Artificial									
Total Uneven-Aged Management									
Site Preparation									
Mechanical									
Chemical									
Prescribed Burn									
slash pile burn									
Total Site Preparation									
Tending									
Cleaning									
manual									
chemical - ground									
- aerial									
mechanical									
prescribed burn									
Spacing, pre-commercial thinning, improvement cutting									
even-aged									
uneven-aged									
Cultivation									
Pruning									
Total Tending									
Protection (Insect Pest Control)									
accelerated harvest									
salvage									
manual protection (Seed Orchard)									
ground insecticide									
aerial insecticide									
Total Protection									
Retreatment									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Total Re-treatment									
Supplemental									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Total Supplemental Treatments									

Table AR-6b

MANAGEMENT UNIT NAME:______________
PLAN TERM:__________TO____________
ANNUAL REPORT:__________TO__________

☐ Total
☐ Harvest
■ Natural Depletion (includes salvage)

AR-6b ANNUAL REPORT OF RENEWAL, TENDING AND PROTECTION OPERATIONS

	Area by Future Forest Unit (ha)								
	<Future Forest Unit>			<Future Forest Unit>			Total		
	Current	To Date	Balance	Current	To Date	Balance	Current	To Date	Balance
Renewal									
Regeneration									
Uneven-Aged Management									
Selection Cut - Harvest									
Total Uneven-Aged Management									
Even-Aged Management									
***Natural* Regeneration**									
Clearcut									
Strip Cut									
Seed Tree Cut									
Uniform Shelterwood Seed Cut									
Subtotal Natural									
***Artificial* Regeneration**									
Planting									
Seeding direct									
with site preparation									
Scarification									
Subtotal Artificial									
Total Uneven-Aged Management									
Total Regeneration									
Site Preparation									
Mechanical									
Chemical									
Prescribed Burn									
slash pile burn									
Total Site Preparation									
Tending									
Cleaning									
manual									
chemical - ground									
- aerial									
mechanical									
prescribed burn									
Spacing, pre-commercial thinning, improvement cutting									
even-aged									
uneven-aged									
Cultivation									
Pruning									
Total Tending									
Protection (Insect Pest Control)									
accelerated harvest									
salvage									
manual protection (Seed Orchard)									
ground insecticide									
aerial insecticide									
Total Protection									
Retreatment									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Total Re-treatment									
Supplemental									
Artificial Regeneration									
Planting									
Seeding direct									
with site preparation									
Scarification									
Total Supplemental Treatments									

The information required for retreated areas applies to artificial treatments only, and must be provided in the same form as the information required in the Artificial Regeneration section for an even-aged management regeneration treatment. Retreatment information may apply in each of the three reports of renewal, tending, and protection operations (AR-6, AR-6a and AR-6b).

Supplemental

Supplemental treatments are regeneration treatments that are applied to assist and supplement the existing regeneration in a forest stand in terms of attaining the regeneration standards and future forest conditions in accordance with the silvicultural ground rules of an approved forest management plan. Examples of supplemental treatments include spot planting, seeding, or scarification to increase the stocking of regeneration on specific areas within a forest stand or operating block. Supplemental treatments may be applied to certain portions of a forest stand or may be applied to the entire forest stand area. Supplemental treatments are normally less intensive or not as comprehensive as the original treatments, yet are required to assist the regeneration in reaching a free-growing condition based on the regeneration standards that apply to a particular site.

The information required for supplemental treatment areas applies to artificial treatments only, and must be provided in the same form as information required in the Artificial Regeneration section for an even-aged management regeneration treatment. Supplemental treatment information may apply to each of the three reports of renewal, tending, and protection operations (AR-6, AR-6a and AR-6b).

The recording of retreated areas (retreatments) and supplemental treatments in separate sections within the applicable annual reports of renewal, tending, and protection (total, harvest and natural depletion) eliminates the double-counting of the area initially renewed, and also provides a treatment record for consideration in future forest management plans. Sustainable forest licence holders (plan holders) are not required to complete the balance columns for Harvest or Natural Depletion tables (AR-6a and AR-6b, respectively) or to complete the balance columns for the Protection, Retreatment, or Supplemental Treatment sections of the Total table (AR-6).

AR-6.1 Annual Report of Quantities of Stock and Tree Seed Used in Renewal Activities

Additional Information

The information required for this table must identify the quantities of nursery stock or seed by species, seed zone, and stock type that were used for renewal operations in the previous fiscal year. The requirement for this information, in a specified tabular format, supports the information which is required in the text of the annual report, and provides a consistent format for summarizing this information for geographic areas which are greater than a single management unit (i.e., district, region, eco-zone, seed zone, etc).

Sustainable forest licence holders (plan holders) must identify the quantities (in thousands) of nursery stock planted and seeds broadcast. The quantities of nursery stock or seed reported in this table, and which must be provided as information, should be consistent with the information (areas) reported for artificial regeneration in Table AR-6. Table AR-6.1 shows the information that must be provided.

Table AR-6.1

MANAGEMENT UNIT NAME:________________
PLAN TERM:__________**TO**______________
ANNUAL REPORT:__________**TO**__________

AR 6.1 Quantities of Stock and Tree Seed Used in Renewal Activities
(i.e. Planting and Seeding Artificial Regeneration Treatments)

Species	Seed Zone/ Breeding Zone	Stock Type	Number of Seeds used in Direct Seeding (000's) or Number of Nursery Stock Planted (000's)		
			Current Year	To Date	Balance

Any inconsistencies or anomalies in the information provided in Table AR-6.1 must be rationalized in the associated text of the annual report. One of the following stock types must be identified in the Stock Type attribute: seed, bareroot, or container. Sub-categories of these main stock types may also be provided (e.g., Jiffy Pot, paper pot, Spencer-Lemare 6's, 1+1 Bareroot).

AR-6.2 Annual Report of Quantities of Tree Seed Collected

Additional Information

The information required for this table must identify the volumes of tree seed collected by species, seed zone, and seed collection area type, in support of tree improvement activities which occurred during the previous fiscal year. This information supports the text of the annual report, and provides a consistent format for summarizing this information for geographic areas which are greater than a single management unit (i.e., district, region, eco-zone, seed zone, etc). Table AR-6.2 shows the information that must be provided.

Sustainable forest licence holders (plan holders) must identify volumes of seed collected in hectolitres (hl). Any inconsistencies or anomalies in the information provided in Table AR-6.2 must be rationalized in the associated text of the annual report. One of the following seed collection sources must be identified in the Source of Seed Collection attribute: bulk stand, seed collection area, seed production area, or seed orchard.

Table AR-6.2

MANAGEMENT UNIT NAME:_______________
PLAN TERM:__________**TO**____________
ANNUAL REPORT:__________**TO**____________

AR 6.2 Annual Report of Quantities of Tree Seed Collected

Species	Seed Zone/ Breeding Zone	Source of Seed Collection	Volume of Seed Collected (hl)		
			Current Year	To Date	Balance

AR-7 Annual Report of Assessment of Regeneration Success

The information required in this table must reflect the results of regeneration surveys or silvicultural effectiveness monitoring surveys, by forest unit and silvicultural treatment package, in accordance with the silvicultural ground rules in an approved forest management plan.

Supplemental Interpretation

Regeneration Success

An area is considered to be a regeneration success (i.e., successfully regenerated) when it has been surveyed and assessed for free-growing conditions and meets or exceeds the regeneration standards for the applied silvicultural treatment package in accordance with the silvicultural ground rules in an approved forest management plan. Sustainable forest licence holders (plan holders) must provide information for all areas which were surveyed/assessed, regardless of whether the areas have been determined to be a regeneration success or not. The SEMMO describes the methodologies and process for assessing regeneration success.

Forest Unit

This information refers to the forest unit that best describes the stand(s) at the time of harvest.

Additional Information

The original Table AR-7, as described in the FMPM, has not changed but has been augmented by two additional tables to track the area assessed for regeneration success for areas depleted by harvest separately from areas which were depleted by natural causes. Sustainable forest licence holders (plan holders) must provide information for the following tables:

- Table AR-7 Report of Total Area (harvested + natural depleted and salvage)
- Table AR-7a Report of Harvested Areas Only
- Table AR-7b Report of Natural Depleted Areas (which includes salvage operations)

The information required for these tables is shown in Tables AR-7, AR-7a and AR-7b respectively. Regeneration assessment information related to salvage treatments must be included as part of the natural depletion report information required in Table AR-7b.

Table AR-7

MANAGEMENT UNIT NAME:____________
PLAN TERM:________TO__________
ANNUAL REPORT:________TO________

☒ Total
☐ Harvest
☐ Natural Depletion (includes salvage)

AR-7 ANNUAL REPORT OF ASSESSMENT OF REGENERATION SUCCESS

Forest Unit	Silvicultural Treatment Package	Area Assessed (ha)			Area which meets Regeneration Standards (ha)	
		Current	To Date	Balance	Current	To Date
	Total					

Table AR-7a

MANAGEMENT UNIT NAME:____________
PLAN TERM:________TO__________
ANNUAL REPORT:________TO________

☐ Total
☒ Harvest
☐ Natural Depletion (includes salvage)

AR-7a ANNUAL REPORT OF ASSESSMENT OF REGENERATION SUCCESS

Forest Unit	Silvicultural Treatment Package	Area Assessed (ha)			Area which meets Regeneration Standards (ha)	
		Current	To Date	Balance	Current	To Date
	Total					

Table AR-7b

MANAGEMENT UNIT NAME:____________
PLAN TERM:________TO________
ANNUAL REPORT:________TO________

☐ **Total**
☐ **Harvest**
☒ **Natural Depletion (includes salvage)**

AR-7b ANNUAL REPORT OF ASSESSMENT OF REGENERATION SUCCESS

Forest Unit	Silvicultural Treatment Package	Area Assessed (ha)			Area which meets Regeneration Standards (ha)	
		Current	To Date	Balance	Current	To Date
	Total					

As part of the tracking of the silvicultural activities and regeneration status on all managed Crown lands, it is essential that regeneration assessments and successes are recorded separately for both harvested and naturally depleted areas.

The basic descriptions of the information required for Table AR-7 in PartC, Section 3.2 of the FMPM also apply to Tables AR-7a and AR-7b. SFL holders (plan holders) are not required to provide information for the balance columns in the Harvest or Natural Depletion tables (Tables AR-7a and AR7b, respectively.

AR-8.0 Annual Report of Harvest and Projected Regeneration

There are no changes to the information required in this table.

AR-8.1 Annual Report of Natural Depletions and Projected Regeneration

Additional Information

Sustainable forest licence holders (plan holders) must provide information about their projections of when naturally depleted areas are expected to be regenerated successfully. This information must be provided by original forest unit, future forest unit and future year. The information required is shown in Table AR-8.1 and is an additional annual report requirement. The basic descriptions of the information required in this table are the same as those described for Table AR-8. Salvage areas must be included as Natural Depletion information for this table.

Table AR-8.1

MANAGEMENT UNIT NAME:______________
PLAN TERM:__________**TO**____________
ANNUAL REPORT:__________**TO**____________

AR-8.1 ANNUAL REPORT OF NATURAL DEPLETION AND PROJECTED REGENERATION

Original Forest Unit	Naturally Depleted Area (ha)	Area Available for Regeneration	Future Forest Unit	Projected area regenerated successfully by year (ha)						Total (ha)
				<Year>	<Year>	<Year>	<Year>	<Year>	<Year>	
			Subtotal							
All Forest Units										
			Total							

AR-9 Annual Report of Regeneration Success

The information required in this table must identify the areas which are successfully regenerated during the fiscal year of operations, by original forest unit, regenerated forest unit and the year in which the original forest unit area was depleted.

Additional Information

The original Table AR-9, as described in the FMPM, has not changed but has been augmented by two additional tables to track areas which have been successfully regenerated. Regeneration success is tracked separately for areas depleted by harvest and areas depleted by natural causes. Sustainable forest licence holders (plan holders) must provide information for three separate versions of the Annual Report of Regeneration Success:

- Table AR-9 Report of Total Area (harvested + natural depleted and salvage)
- Table AR-9a Report of Harvested Areas Only
- Table AR-9b Report of Natural Depleted Areas (which includes salvage operations)

The information required in these three tables is shown in Tables AR-9, AR-9a and AR-9b respectively. Information related to salvage treatments must be included as part of the natural depletion report information required in Table AR-9b.

The requirements for information described in Part C, Section 3.2 of the FMPM for Table AR-9 must also be applied to the similar information contained in Tables AR-9a and AR-9b.

Table AR-9

MANAGEMENT UNIT NAME:______________
PLAN TERM:__________TO____________
ANNUAL REPORT:__________TO__________

☒ **Total**
☐ **Harvest**
☐ **Natural Depletion (includes salvage**

AR-9 ANNUAL REPORT OF REGENERATION SUCCESS

Original Forest Unit	Regenerated Forest Unit	Areas successfully regenerated by year of *disturbance (ha)						Total (ha)
		<year>	<year>	<year>	<year>	<year>	<year>	
	Subtotal							
All Forest Units								
	Total							

*Disturbance caused by harvest and natural depletion (e.g. caused by fire, insects and disease) occurence.

The separation of total areas that have been successfully regenerated into areas harvested versus areas naturally depleted provides a more direct comparison to forest management plan objectives and strategies which determine area to be harvested and regenerated. This information also provides a better indicator of sustainable forest management for both harvested areas and naturally regenerated areas. As part of tracking the silvicultural activities and regeneration status for all Crown lands within a forest management unit, it is essential that regeneration assessments and successes are also recorded for naturally depleted areas.

Table AR-9a

MANAGEMENT UNIT NAME:______________
PLAN TERM:__________TO____________
ANNUAL REPORT: __________TO__________

☐ **Total**
☒ **Harvest**
☐ Natural Depletion (includes salvage)

AR-9a ANNUAL REPORT OF REGENERATION SUCCESS

Original Forest Unit	Regenerated Forest Unit	Areas successfully regenerated by year of harvest (ha)						Total (ha)
		<year>	<year>	<year>	<year>	<year>	<year>	
	Subtotal							
All Forest Units								
	Total							

Table AR-9b

MANAGEMENT UNIT NAME:_______________
PLAN TERM:__________**TO**____________
ANNUAL REPORT:__________**TO**__________

☐ **Total**
☐ **Harvest**
☒ **Natural Depletion (includes salvage**

AR-9b ANNUAL REPORT OF REGENERATION SUCCESS

Original Forest Unit	Regenerated Forest Unit	Areas successfully regenerated by year of *Natural Depletion (ha)						Total (ha)
		<year>	<year>	<year>	<year>	<year>	<year>	
	Subtotal							
All Forest Units								
	Total							

*Natural depletion (e.g., caused by fire, insects and disease) includes salvaged areas.

AR-10 Annual Report of Primary and Secondary Road Construction and Use Management

Sustainable forest licence holders (plan holders) must provide information required in the Annual Report of Primary and Secondary Road Construction and Use Management as shown in Table AR-10.

Table AR-10

MANAGEMENT UNIT NAME:_______________
PLAN TERM:__________**TO**____________
ANNUAL REPORT:__________**TO**__________

AR-10 ANNUAL REPORT OF PRIMARY AND SECONDARY ROAD CONSTRUCTION AND USE MANAGEMENT

Road Name	Road		Construction (km)			Use Management		
	Class	Length (km)	Current	To Date	Balance	Maintenance	Access Control	Abandonment
A. New Roads								
Subtotal								
B. Existing Roads								
Subtotal								

Supplemental Interpretation

Construction

The length of road construction that is reported annually should be consistent with the length of road which was forecast in the approved plan (Table FMP-26) and AWS (Table AWS-5) such that no double-counting of road construction occurs.

Use Management – Maintenance

The length of road maintained is not required, but a brief text summary of maintenance activity for each road must be provided in the annual report. If maintenance work is indicated in the table, the entire road length entered under the Road Length column is used to quantify the amount of maintenance done.

Use Management – Access Control

If access control is indicated, the entire road length entered under the Road Length column is used to quantify the amount of road under access control.

Additional Information

Sustainable forest licence holders (plan holders) must provide information that identifies the method which was used to abandon roads or to control access to existing forest access roads on Crown lands. This additional information requirement is identified within Appendix 18 and Appendix 20 of the T & Cs of the Timber Class EA.

The information required in the Access Control column must identify one of the following access control methods: Gate/Physical barrier, Signage, Other.

Gate/Physical Barrier

Access controlled by use of a gate or physical barrier such as a burm or ditch.

Signage

Access controlled by erecting signs that request users to comply with the listed restrictions.

Other

Any other method of access control (e.g., culvert removal).

Abandonment

If abandonment is indicated, the entire road length must be provided in the Road Length column to quantify the amount of road abandoned. The information required in the Abandonment column must identify one of the following types: Natural Abandonment, Physical Abandonment.

Natural Abandonment
Natural abandonment occurs when road maintenance activities cease and the road bed is allowed to degrade and revert to a natural state.

Physical Abandonment

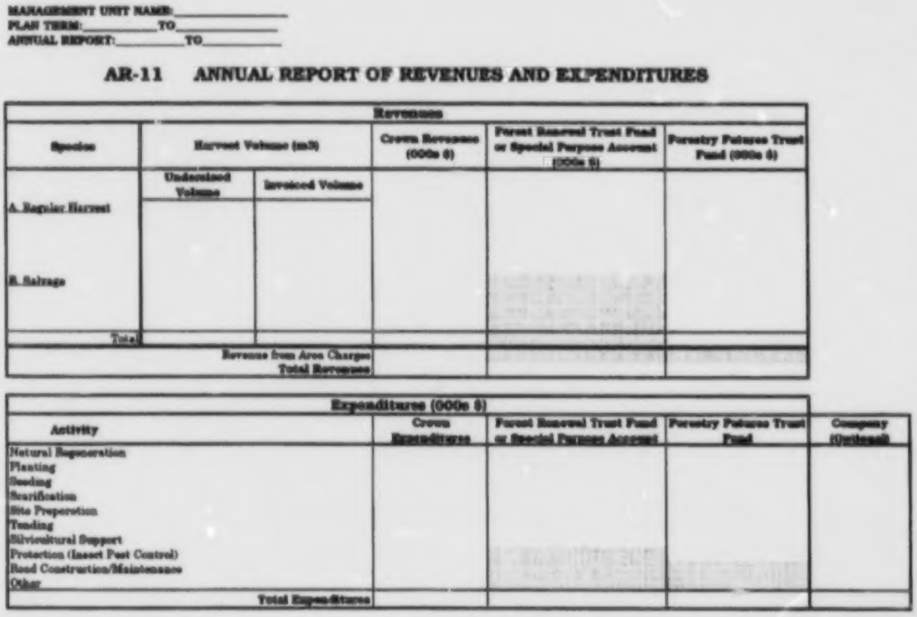
Physical abandonment occurs when measures are used to prevent access to, or continued use of, the road. Physical measures may include, but are not limited to, the removal of bridges and culverts, gating, and tearing up or destruction of the roadbed.

AR-11 Annual Report of Revenues and Expenditures

Supplemental Interpretation

Both the MNR and SFL holders (plan holders) are required to provide information to complete the Annual Report of Revenues and Expenditures. Only those revenues and expenditures that resulted from forestry activities that occurred during the fiscal year of the report (April 1 to March 31), are included in this table. Harvest volumes reported in this table must equal the harvest volumes reported in Tables AR-3 and AR-5. The information required is shown in Table AR-11.

Table AR-11



MANAGEMENT UNIT NAME:______________
PLAN TERM:__________TO____________
ANNUAL REPORT:__________TO____________

AR-11 ANNUAL REPORT OF REVENUES AND EXPENDITURES

Revenues					
Species	Harvest Volume (m3)		Crown Revenues (000s $)	Forest Renewal Trust Fund or Special Purpose Account (000s $)	Forestry Futures Trust Fund (000s $)
	Undeclared Volume	Invoiced Volume			
A. Regular Harvest					
B. Salvage					
Total					
Revenue from Area Charges					
Total Revenues					

Expenditures (000s $)				
Activity	Crown Expenditures	Forest Renewal Trust Fund or Special Purpose Account	Forestry Futures Trust Fund	Company (Optional)
Natural Regeneration Planting Seeding Scarification Site Preparation Tending Silvicultural Support Protection (Insect Pest Control) Road Construction/Maintenance Other				
Total Expenditures				

Revenues Section

Stumpage revenues and funds deposited into the Forest Renewal Trust Fund and the Forestry Futures Funds are now tracked using the Ontario Timber Accounts Receivable (OTAR) and the Ontario Government Financials and Revenues (OGFR) information systems. Effective November 8, 1999 the MNR began providing SFL holders (plan holders) with the revenue information for their management unit at year-end using the accrual method. The accrual method of accounting is used to determine the revenues information required in this table and represents the amounts for which SFL holders (plan holders) were invoiced during the year of operations. The MNR will provide SFL holders (plan holders) with revenues information two months prior to the licence holder's (plan holder's) timeline to provide annual report information in accordance with Section 2.4.

Species

Harvest volumes must be recorded separately for the species harvested. The species should match the species listed in Table AR-3 for regular harvest and Table AR-3a for salvage harvest.

Harvest Volume

Harvest volumes must be determined from TREES information system and MNR must provide the harvest volume information.

Crown Revenues

Crown revenues are derived from the combination of the minimum stumpage rate and the residual value charge which have been received by the Crown. The MNR must provide the Crown Revenues information to SFL holders (plan holders). The Crown revenues apply to the Invoiced Volumes reported under the Harvest Volume column in this table.

Forest Renewal Trust Fund or Special Purpose Account

Sustainable forest licence holders (plan holders) must report invoiced amounts accruing to the Forest Renewal Trust Fund, while the MNR must report amounts accruing to the Special Purpose Account for Crown Units. Under normal circumstances, renewal charges are not assessed against salvage.

Forestry Futures Trust Fund

The amount accruing to the Forestry Futures Trust Fund is a set rate for all species and, therefore, is not required to be reported by species. However, the total amount invoiced must be reported at the bottom of this column.

Revenue from Area Charges

Effective April 1, 1998 area charges were no longer collected and therefore this table entry should be shown as "nil".

Expenditures Section

The expenditures information reported in this table must agree with expenditure reports from the Forest Renewal Trust Fund, Forestry Futures Trust Fund, and the Special Purpose Account. The MNR must provide SFL holders (plan holders) with expenditures from Crown and Special Purpose Accounts. Both the MNR and SFL holders (plan holders) must verify their records and reports against the reports received from the different trust fund and account administrators.

Since the expenditures portion of this table was originally created, the list of eligible silvicultural activities and eligible expenditures has been expanded to include the following:

- Cone Collection and Transport
- Seed Extraction, Storage, Testing, and Transport
- Tree Improvement
- Stock Purchases and Delivery
  - Bareroot
  - Container
  - Cuttings
  - Other

- Tree Planting
  - Bareroot
  - Container
  - Cuttings
  - Other

- Seeding
  - Direct
  - With Site Preparation

- Scarification (for natural seeding)

- Site Preparation
  - Mechanical
  - Chemical (includes cost of chemicals)
  - Prescribed Burn

- Tending
  - Cleaning
  - Spacing, Thinning (pre-commercial only), and Improvement (even-aged)
  - Improvement (uneven-aged)

- Tree Marking (boundary marking is not eligible)
- Harvest and Regeneration Option (HARO)
- Modified Harvest Cutting
- Silvicultural Surveys (e.g., free-to-grow, not sufficiently regenerated (NSR), etc.)

The level of detail reported in this table will continue to be limited to the activities listed in Table AR-11 as described in the FMPM. New activities should either be combined with an existing activity or included in the Other column.

Sustainable forest licence holders (plan holders) must provide information regarding the expenditures made by the licence holder (plan holder), by activity type, from the Forest Renewal Trust Fund or Forestry Futures Trust Fund. Sustainable forest licence holders (plan holders) must only provide expenditure information by individual activity level in accordance with the FIPPA, such that expenditures paid to individual contracts or contractors cannot be identified. As a general rule, the expenditures from at least three contracts or contractors, and their associated activities, should be combined to protect the identification of the individuals and individual contract values. All expenditures must be reported. Therefore, the expenditures from one or more activities should be combined as required. When combining single activities and associated expenditures, they should be combined with similar activities. For example, planting and seeding activities may be combined and summarized for the purpose of retaining confidentiality and subsequently reported as artificial regeneration expenditures.

Company Expenditures

Reporting of this information is optional.

Additional Information

The MNR must provide SFL holders (plan holders) with harvest volume information that is summarized by Undersized Volume and by Invoiced Volume. Undersized Volume is the volume of timber which is not considered to be merchantable timber as defined by the Scaling Manual. Invoiced Volume is the volume of timber for which Crown dues are paid and revenues are received. Invoiced Volumes are based on the volume of timber which meets the merchantable timber standards as defined in the Scaling Manual. The total harvest volumes of Undersized Volumes plus the Invoiced Volumes reported in this table must equal the Total Harvest Volumes Utilized as reported in Table AR-3.

AR-12 Annual Report of Forest Operations Inspections

Until 1998, the MNR had the responsibility to conduct forest operations inspections, prepare individual reports on compliance inspections, and summarize the individual inspection reports into an annual report summary in Table AR-12. On April 1, 1998 SFL holders became responsible for conducting forest operations inspections and filing compliance reports. Table AR-12 in the FMPM has been modified to distinguish between the responsibilities for compliance inspection activities and reporting conducted by the MNR and compliance activities and reporting conducted by SFL holders (plan holders). The requirements for information related to Forest Operations Inspections are now described in two annual report tables:

- AR-12.1 Annual Report of Forest Operations Inspections Conducted by SFL Holders (Plan Holders)

- AR-12.2 Annual Report of Forest Operations Inspections Conducted by the Ministry of Natural Resources

Supplemental Information

The MNR maintains the responsibility for compliance audits and monitoring inspections and the completion of the annual summary of compliance activities and actions as described in the FMPM. The MNR also maintains the responsibility to complete both Tables AR-12.1 and AR-12.2 using information maintained in the FOCIS information system. The information requirements for the FOCIS information system are described in Section 5.0. The MNR must ensure that SFL holders (plan holders) are provided with the information required in Tables AR-12.1 and AR-12.2.

Table AR-12.1 summarizes information which results from the responsibilities of SFL holders (plan holders) to conduct forest operations inspections and provide inspection reports. Table AR-12.2 summarizes information which encompasses the responsibilities of MNR to conduct inspection audits/spot-checks, monitor compliance activities, and determine the significance of compliance infractions and actions taken by MNR staff.

AR-12.1 Annual Report of Forest Operations Inspections Conducted by SFL Holders (Plan Holders)

The MNR must compile the information from forest operations inspection reports conducted and provided by SFL holders (plan holders) during the previous fiscal year for the purpose of completing Table AR-12.1. The information required in this table has been divided into two parts, as shown in Table AR-12.1. Part A summarizes the results of inspection reports for the five common operation types only and Part B summarizes results of inspection reports for specific items as required by the T & Cs of the Timber Class EA.

To assist in the transition from Table AR-12 in the FMPM to Table AR-12.1, many of the column and row titles from Table AR-12 appear in brackets in Table AR-12.1. The MNR must provide SFL holders (plan holders) with the information required for Table AR-12.1 by April 10, immediately following the end of the previous fiscal year of operations, as described by the timelines in Section 2.4.

Part A – Forest Operations Inspected

Noted on Reports Section

The Total Number of Reports and the Ha or Km columns require information on the number of times each activity was inspected and recorded (number of inspections), along with an estimate of the area in hectares (ha) or the length of road in kilometres (km) inspected by operation type. The number of inspections will be determined by the number of reports completed by forest operation type. Maintenance operations include tending activities.

Table AR-12.1

MANAGEMENT UNIT NAME:______________
PLAN TERM:__________**TO**______________
ANNUAL REPORT:__________**TO**____________

AR-12.1 ANNUAL REPORT OF FOREST OPERATIONS INSPECTIONS
Conducted by Sustainable Forest Licence Holders (Plan Holders)

A. Forest Operations Inspected (Activity Inspected)	**Noted on Reports**		**Number of Reports** (Number of Instances)	
	Total Number of Reports	Ha or Km	In-Compliance	Non-Compliance
ACCESS				
HARVEST				
RENEWAL				
MAINTENANCE (Tending)				
PROTECTION				
Totals: (Total Number of Inspection Reports Completed)		▨		
B. Special Report Items required by EA Terms and Conditions				
Number of Washouts of Water Crossings on Access Roads (Road Washouts)		▨	▨	▨
Operated inside AOC Boundary (Trespass into Reserves)		▨		
Wasteful Practices		▨		
Timber Wastage - unmerchantable		▨		

Total Number of Reports

This part of the table does not include "Company Use Only" and "Pre-Operation" inspections that were conducted by the SFL holder (plan holder), but does include all other inspection reports conducted by both SFL holders (plan holders) and the MNR. The Total Number of Reports, as identified by activity in this column, must be equal to the total of the Number of Reports columns for In-compliance and Non-compliance information.

Ha or Km

The estimate of the area or length will be the total area (i.e., hectares of harvest, renewal, tending, and protection) or the total length of road (i.e., kilometres of road constructed and maintained). These numbers do not need to match the actual annual report numbers precisely. Estimates will suffice.

Number of Reports Section

The Number of Instances section heading in the original Table AR-12 in the FMPM has been replaced by the Number of Reports section heading in Table AR-12.1. The FMPM does not provide a clear definition of what constitutes an instance. An instance is equivalent to a report by operation type. The sub-headings in this column have been reduced to In-compliance and Non-compliance, since SFL holders (plan holders) are not required to assess the significance of non-compliant operations.

Minor harvesting infractions that are within tolerable levels are recorded in the FOCIS information system as In-compliance with Comments. For the purpose of providing information for the Number of Reports in Table AR-12.1, reports which are In-compliance with Comments are included in the In-compliance column.

Undesirable occurrences (e.g., beaver dam causing a road washout) are not included in operation, activity, or checklist summaries and should not be included in Table AR-12.1.

A report for one operation type may record more than one occurrence of a non-compliant activity. When this situation occurs, only the most significant occurrence of non-compliance per operation type is required to be recorded in the Non-compliance column.

Part B – Special Report Items Required by EA Terms and Conditions

Noted on Reports Section

The same standards apply to Part B as for Part A, except that the Ha or Km column in Part B is not required to be completed because the activities are sub-sets of the operations reported in Part A.

Number of Reports Section

The same standards apply to the information required in Part B as for Part A.

Number of Washouts of Water Crossings on Access Roads

Only the number of washouts of water crossings on access roads is required in the Total Number of Reports column. The size of the area (Ha or Km) and In-compliance and Non-compliance information are not required.

Operated Inside AOC Boundary

The total number of reports of harvest and access operations that took place within the boundary of an Area of Concern (AOC) reserve, as identified by the applicable activity checklist item in the FOCIS information system, must be recorded. The number of reports applicable to these operations and situations must also be identified separately for instances of In-compliance and Non-compliance within the Number of Reports section.

Wasteful Practices

The total number of Harvest reports, where one or more items on the Wasteful Practices checklist have been identified in the FOCIS information system, must be recorded. Also, the applicable number of reports of Wasteful Practices for instances of In-compliance and Non-compliance must be recorded separately in the Number of Reports section. In situations, where more than one item is identified as non-compliant, from the Wasteful Practices checklist within the FOCIS information system, these instances are counted as one report in the Non-compliance column.

AR-12.2 Annual Report of Forest Operations Inspections Conducted by the Ministry of Natural Resources

To create Table AR-12.2, the MNR must compile the total number of Forest Operations Inspection Reports conducted by SFL holders (plan holders), as reported in Table AR-12.1, with information from MNR inspections of industry reports of non-compliance and MNR actions taken, for forest operations conducted during the previous fiscal year.

The information required in this table has been divided into two parts, as shown in Table AR-12.2. Part A summarizes the results of inspection reports and actions taken in relation to the five common operation types only, and Part B summarizes results of inspection reports and actions taken for specific items as required by the T & Cs of the Timber Class EA.

Table AR-12.2

MANAGEMENT UNIT NAME:____________
PLAN TERM:________TO__________
ANNUAL REPORT:________TO________

AR-12.2 ANNUAL REPORT OF FOREST OPERATIONS INSPECTIONS
Conducted by the Ministry of Natural Resources

A. Forest Operations Inspected (Activity Inspected)	Noted on Reports	Number of Reports of Non-Compliance (Number of Instances)				Action Taken			
	Total Number of Reports	Minor	Moderate	Significant	Total Non-Compliance	Ongoing	Resolved	Warning	Penalty
ACCESS									
HARVEST									
RENEWAL									
MAINTENANCE (Tending)									
PROTECTION									
Totals: (Total Number of Inspection Reports Completed)									
B. Special Report Items required by EA Terms and Conditions									
Number of Washouts of Water Crossings on Access Roads (Road Washouts)		▨	▨	▨	▨	▨	▨	▨	▨
Operated inside AOC Boundary (Trespass into Reserves)									
Wasteful Practices									
Timber Wastage - unmerchantable									

To assist in the transition from Table AR-12 in the FMPM to AR-12.2, many of the column and row titles from Table AR-12 appear in brackets in Table AR-12.2. The MNR must provide SFL holders (plan holders) with the information for Table AR-12.2 by April 10, immediately following the end of the previous fiscal year of operations as described by the timelines in Section 2.4.

Part A – Forest Operations Inspected

Noted on Reports Section

The number of inspections will be determined by the number of reports made by forest operation type. Maintenance operations include tending activities.

Total Number of Reports

This part of the table does not include Company Use Only and Pre-Operation inspections conducted by the SFL holder (plan holder), but does include all other inspection reports conducted by both SFL holders (plan holders) and the MNR. The Total Number of Reports, as identified by activity in this column, also includes both In-compliance and Non-compliance reports. Reports of In-compliance with Comments are also included and recorded with reports of In-compliance.

Number of Reports of Non-compliance Section

The FMPM does not provide a clear definition of what constitutes an instance. An instance is equivalent to a report by operation type as required in the Number of Reports of Non-compliance column.

One operation type report may record more than one occurrence of a non-compliant activity. For example, when this situation occurs, only the most significant occurrence of non-compliance per operation type is required in this table.

Minor, Moderate, and Significant Non-compliance

Inspectors from the MNR are required to provide the number of instances of undesirable occurrences from inspections using the following three categories of significance: Minor, Moderate, and Significant. For reporting purposes, the Very Significant occurrence reports will be tallied and included in the Significant column. Reports of undesirable occurrences, which are not a result of non-compliance (e.g., beaver dam causing a road washout), should not be included in this table. Therefore, the Total Non-compliance column should equal the sum of the other three categories.

Action Taken Section

For each report of non-compliance recorded under the Number of Reports of Non-compliance columns, there must be a corresponding tally under one of the four Action Taken columns indicating how the non-compliant activity was addressed. It is important that all non-compliant inspection reports have the Action and Follow-up Action fields within the FOCIS information system updated to reflect the status of actions taken at the time that the information in Table AR-12.2 is compiled.

If, at the time the Table AR-12.2 information is generated, no action has been taken with respect to a Report of Non-compliance, the report should be tallied as Ongoing, along with an explanatory note in the text. The total number of non-compliant reports recorded (i.e., total of Minor + Moderate + Significant) should equal the total number of actions taken (i.e., Ongoing + Resolved + Warning + Penalty). The numbers listed under the Penalty column include actions, such as penalties, fines, suspension or cancellation of a licence, and stop, repair, or compliance orders.

Part B – Special Report Items Required by EA Terms and Conditions

Number of Reports

The same standards apply to Part B as for Part A.

Number of Washouts of Water Crossings on Access Roads

Only the number of washouts of water crossings on access roads is required in the Total Number of Reports column.

Operated Inside AOC Boundary

The total number of Harvest and Access Operations Reports (which includes both compliant and non-compliant reports), where this AOC activity checklist item was checked off in the FOCIS information system, must be provided in the Total Number of Reports column. The number of reports of Harvest and Access Operations that occurred within an AOC Reserve boundary which are non-compliant, and in which the respective activity checklist item in the FOCIS information system was entered as non-compliant, must be recorded in the appropriate significance category columns. The sum of the significance category columns is required in the Total Non-compliance column.

Similar to Part A of the table, the total number of non-compliant reports should equal the total number of actions taken. For reporting purposes, the "Very Significant" occurrence reports will be tallied in the Significant category column.

Wasteful Practices

The total number of harvest reports in which the Wasteful Practices checklist item was identified in the FOCIS information system must be recorded in the Total Number of Reports column. This information will include both compliant and non-compliant reports. The number of harvest operation reports in which this activity checklist item was found to be non-compliant in the FOCIS information system must be recorded in the appropriate significance category columns. The sum of the significance category columns is required in the Total Non-compliance column.

Similar to Part A of the table, the total number of non-compliant reports recorded should equal the total number of actions taken.

AR-13 Annual Report of Pesticide Usage

Additional Information

Sustainable forest licence holders (plan holders) must provide information that summarizes the pesticides that were applied during the previous fiscal year. The information required is shown in Table AR-13.

Table AR-13

MANAGEMENT UNIT NAME:____________
PLAN TERM:________ **TO**__________
ANNUAL REPORT:________ **TO**__________

AR-13 Annual Report of Pesticide Usage

Application Type	Purpose of Application	Pesticide Used			Incidents (Yes/No)	Complaints (Yes/No)
		Trade Name and PCP No.	Size of Area Treated (ha)	Total Quantity of pesticide Product used (in L or kg)		

Table AR-13 is part of a joint information report form that is produced to meet requirements of both the MNR and the Ministry of Environment. The pesticides information identified in Table AR-13 is required with submission of the annual report and must be maintained as central records by the MNR.

The following standards describe the information required in Table AR-13:

Application Type

One of the following methods of application must be listed:
- ground application
- aerial fixed wing

- aerial rotary wing
- other (specify method)

Purpose of Application

One of the following application purposes must be listed:

- site preparation
- cleaning (conifer release)
- protection (specify pest)
- other (specify purpose)

Trade Name and PCP Number

The pesticide product name and the *Pest Control Products Act* registration number of the pesticide used must be reported.

Size of the Area (hectares)

The size in hectares of the area treated must be reported.

Total Quantity of Pesticide Product Used (litres or kilograms)

The volume (litres) or the weight (kilograms) of pesticide used must be reported. This is not the volume of spray mixture.

Incidents (Yes/No)

An indication of whether or not any incidents happened during the application (e.g., spills, over-spray, aircraft down, etc.) is required. If an incident did occur, a separate report describing the incident must be attached.

Complaints (Yes/No)

An indication of whether or not there were any complaints, reports of health affects, or other reported complaints from workers or the public about the pesticide application. If a complaint or report has been received, then a separate report describing the details of the complaint(s) including a copy of letter(s) received must be attached.

2.3 Roles and Responsibilities for Annual Report Tabular Information

Sustainable forest licence holders (plan holders) are responsible for ensuring that the information provided by the MNR is checked for completeness and verified for accuracy. They must contact the MNR District Manager regarding any discrepancies between information provided by the MNR and similar data, records, and information which are maintained by the SFL holders (plan holders). Sustainable forest licence holders (plan holders) must also incorporate the information provided by the MNR into the annual report. Discrepancies in annual report information should be resolved prior to the submission of the annual report.

The MNR is also responsible for ensuring that the digital information provided by the SFL holder (plan holder) is checked for completeness and verified for accuracy. The MNR will apply the *Annual Report Preparation and Review Protocol* when performing these responsibilities. The MNR District Manager must provide confirmation to the SFL holder (plan holder), indicating whether or not the annual report (hardcopy) and the annual report tabular information (digital) are complete and accurate, and whether or not they have been accepted. If the information is incomplete or inaccurate, the MNR District Manager will provide written notice to the SFL holder (plan holder) that the annual report and/or annual report tabular information has not been accepted, and provide the reason(s) why.

In reviewing the annual report or the annual report tabular information, the MNR, may request access or provision of source, records, and information from the SFL holders (plan holders). The MNR will treat the source data, information, and records which are made available or are provided by the SFL holder (plan holder) in accordance with the direction provided in Part A, Section 1.4.2. In other cases, the MNR may request other records and information which are considered as part of the annual report information.

2.3.1 Information Related to Monitoring and Assessment

The requirements to establish a monitoring and assessment program are described in Part A, Section 2.5 of the FMPM. The requirements for the MNR to provide a summary of the results of the monitoring program in the text of the annual report, as part of forest operations inspections, are described in Part C, Section 3.0 of the FMPM.

As part of the MNR's role to verify annual reporting information, and responsibility to prepare an annual summary of forest operations inspections, the MNR may request access to, or provision of, other records and information with respect to monitoring and assessment, in accordance with an approved forest management plan. Requests for other records and information about monitoring and assessment must be related to the verification of the information (tables, text, maps, etc.) contained in, or associated with, annual reporting or implementation of the approved forest management plan.

The MNR will provide the SFL holder (plan holder) with the rationale as to how the MNR will use and consider the information requested. Requests for access to, or provision of, other records and information may include documentation maintained as part of the monitoring and assessment program, data collected from surveys and the monitoring methods employed, analysis and assessment of survey data, and observations or results and conclusions produced from the data collected.

Sustainable forest licence holders (plan holders) must provide the MNR with access to, or provision of, this information. Both the MNR and SFL holders (plan holders) will consult with each other to determine the most efficient and cost-effective means to ensure the appropriate access to, or provision of, the requested information.

2.3.2 Sensitive or Confidential Information

Sustainable forest licence holders (plan holders) may identify sensitive or confidential information that has been provided to the MNR for the purposes of annual report information submission. Sustainable forest licence holders (plan holders) must identify the sensitive or confidential information in accordance with FIPPA and identify the reasons why the information is sensitive or confidential. The MNR will comply with FIPPA when considering requests for the confidentiality of such information.

This same consideration may also apply to sensitive annual report information that, if released, may pose a threat to the existence, integrity, or health of forest values, Native values, or recognized forest uses. The MNR may make decisions to restrict access to sensitive annual report information to ensure the protection of these values.

2.3.3 Archiving Information

Sustainable forest licence holders (plan holders) must retain and archive all annual report tabular information which they have provided to the MNR and information which has been provided by the MNR. Digital information must be archived on a retrievable computer medium, since annual report information may be required for up to 20 years for the purposes of preparing a Report of Past Forest Operations (RPFO).

Similarly, the MNR will ensure that all annual report tabular information which they have provided to SFL holders (plan holders), or that they have received from SFL holders (plan holders), is archived on a retrievable computer media as described in Part A, Section 1.7.3.

The archiving of information also encompasses source data, records, and information and other records and information, in digital or hardcopy form.

2.3.4 Use of Annual Report Tabular Information

One of the primary sources of information for updating a forest resources inventory is annual report information. Sustainable forest licence holders (plan holders) must incorporate the annual report tabular information when updating information in either a stewardship inventory and/or a planning inventory. The MNR will verify that annual report information provided by SFL holders (plan holders) has been utilized in updating the applicable stewardship inventory and/or planning inventory in accordance with Part B, Section 5.0.

Annual report tabular information is also used as a primary source of information for the production of the RPFO. Sustainable forest licence holders (plan holders) must ensure that annual report information is used in the production of the RPFO and the MNR will utilize the annual report tabular information for the purpose of checking and verifying information prepared and provided in an RPFO.

Annual report tabular information must correspond to annual report spatial information requirements, silvicultural effectiveness monitoring surveys, forest operations compliance information, and annual report map products. Sustainable forest licence holders (plan holders) must ensure that annual report tabular information reflects the information produced from, or is incorporated into, these other information products. The MNR will utilize the annual report tabular information to check and verify its inclusion and consistency with these other information products.

2.4 Timelines for Annual Report Tabular Information

The timelines required to provide digital annual report tabular information are the same as for the submission of the hardcopy annual report, as described in the FMPM. In accordance with the timelines described in the FMPM and the additional annual report tabular information requirements described in Section 2.1 of the FIM, SFL holders (plan holders) must provide information for specific parts of the annual report based on the following timelines:

Part One – Tables	**Timeline**
Table AR-6	April 15
Table AR-6a	↑
Table AR-6b	
Table AR-6.1	
Table AR-6.2	
Table AR-7	
Table AR-7a	
Table AR-7b	
Table AR-9	
Table AR-9a	
Table AR-9b	
Table AR-10	
Table AR-12.1	
Table AR-12.2	↓
Table AR-13	April 15

Part Two – Tables	**Timeline**
Table AR-1	November 15
Table AR-2	
Table AR-3	
Table AR-4	
Table AR-5	
Table AR-8.0	
Table AR-8.1i	
Table AR-11	November 15

The MNR must provide SFL holders (plan holders) with digital information as described by the requirements in Section 2.1 and the standards in Section 2.2, with the exception of Tables AR-12.1 and AR-12.2, two months prior to the licence holder's (plan holder's) timelines given in this section. The MNR must provide SFL holders (plan holders) with the digital information required in Table 12.1 and Table AR-12.2 by April 10.

The MNR must check the digital annual report tabular information provided by SFL holders (plan holders) within 30 working days of receipt of the information. The MNR must also provide a written confirmation of acceptance or notice of non-acceptance of the information to the SFL holder (plan holder) within this 30-day period.

If the annual report tabular information is not acceptable, the MNR will provide the SFL holder (plan holder) with a list of the required revisions that will be included with the notice of non-acceptance. The required changes, revisions, and corrections must be completed by the SFL holder (plan holder) and delivered to the appropriate MNR District within 30 working days of receiving the written notice of non-acceptance. Revisions must be provided in accordance with the conditions described in Section 2.5.

2.4.1 First Date of Effect for Provision of Digital Annual Report Tabular Information

The first date of effect for the provision of digital annual report tabular information in accordance with Section 2.0 will be for Part Two of the annual report submission required on November 15 pertaining to the 2000/2001 fiscal year of operations. Sustainable forest licence holders (plan holders) must provide annual tabular report information in accordance with the requirements described in Section 2.1 by November 15, 2001 for forest management activities and natural changes which occurred during the 2000/2001 fiscal year of operations. Consequently, the MNR must provide SFL holders (plan holders) with digital information needed in Part Two of the annual report submission (due November 15) as described by the requirements in Section 2.1 by September 15, 2001.

All annual report tabular information requirements must be met for subsequent operating years commencing April 15, 2002.

2.5 Conditions for Annual Report Tabular Information

Sustainable forest licence holders (plan holders) and the MNR must provide digital information, as described by the requirements and standards in Section 2.1 and Section 2.2, respectively, in accordance with the *Technical Specifications for Providing Forest Management Planning and Reporting Information*. These technical specifications identify the data standards and formats for each table of information required in an annual report.

These technical specifications also describe the information needed to create, import, and produce annual report information required in MNR's FARM information system. The MNR will provide SFL holders (plan holders) with the FARM information system at their request and any user's guides that accompany this system. SFL holders (plan holders) may use the system for the purpose of creating and maintaining annual report tabular information prescribed in Section 2.0.

3.0 ANNUAL REPORT SPATIAL ACTIVITIES INFORMATION

This section describes the requirements for spatial coverages and related tabular information which identify the geographic location and extent of forest management activities and natural changes that occurred during the previous fiscal year of operations.

The annual report information described in Sections 2.0 and 3.0 is one of the most important sources of information used to update FRI information (stewardship inventory collection and planning inventory information). Sustainable forest licence holders (plan holders) must utilize the annual report information prescribed in these sections when updating FRI information.

The 1996 version of the *Mapping Requirements and Standards for Forest Management Planning* document identified the requirement to provide hardcopy, composite scale, annual report activities maps on an annual basis. These hardcopy requirements have been replaced with a requirement to provide this same information in digital form, as described in Part E of this manual. Provision of the digital information will provide MNR staff with the ability to reproduce, analyze, review, and utilize the geographic information and related tabular information in these spatial coverages more effectively than the limitations of information contained on a hardcopy map.

In terms of the provision of digital information supported by this manual, this section commits the MNR and SFL holders (plan holders) to a more effective way of managing and utilizing natural resources information that is consistent with current advancements in information systems and information management technology. Before these digital requirements can be applied to other map products, a transition phase will occur to ensure that hardcopy map products can be created by both SFL holders (plan holders) and the MNR in the same fashion and which portray the same information using the same digital sources.

The spatial information required in this section must be consistent with the tabular information described in Section 2.0.

3.1 Requirements for Annual Report Spatial Activities Information

The basic requirement for maps of annual forest management activities is described in Section 3.2 of the FMPM:

> *"The annual report is a combination of tabular, map and text information. The maps which accompany the annual report identify the areas depleted, areas renewed, tended and protected, and the locations of access roads constructed during the year."*

There are three basic themes for annual report spatial activities information: depletions, renewal activities, and road construction and road use. Each of these themes is composed of two separate information requirements:

1) Annual report activities base coverages
2) Composite scale annual report activities maps in digital form (referred to as digital map products), that contain planimetric base features and planning inventory features which have been combined with the annual report activities base coverages.

3.1.1 Requirements for Annual Report Activities Base Coverages

The annual report activities base coverages contain only the spatial features related to each theme. Planimetric base features or other spatial reference features are not included as part of these base coverages. Sustainable forest licence holders (plan holders) are required to create and provide three annual report activities base coverages in digital form:

1) Annual Report Depletion Base Coverage
2) Annual Report Silvicultural Treatment Base Coverage
3) Annual Report Road Construction/Use Base Coverage

Each of these annual report activities base coverages contains a set of associated tabular attributes which provide further description and definition of the spatial features. The tabular attributes are required as part of each spatial coverage. Sustainable forest licence holders (plan holders) must provide the information for each of the annual report activities base coverages in accordance with the requirements described in this section and the standards described in Section 3.2.

3.1.1.1 *Requirements for the Annual Report Depletion Base Coverage*

The annual report depletion base coverage must contain information which identifies the locations and areas within the forest management unit that have been depleted by harvest operations and natural disturbances (fire, insect, disease, blow down, and other forms of natural depletions) which occurred during the fiscal report year. This coverage contains polygon features which identify the following depletion types and their associated productive forest stand boundaries:

a) Harvest
b) Reserve
c) Bypass
d) Natural

The MNR must provide spatial coverages of natural disturbance areas, such as fire, insects, and disease for areas of disturbance which are greater than 40 hectares. The MNR will ensure that these natural disturbance spatial coverages are provided to SFL holders (plan holders) two months prior to the SFL holder's (plan holder's) timeline to provide the annual report depletion base coverage information.

These natural disturbance coverages identify the gross area affected by the type of natural disturbance and provide SFL holders (plan holders) with a preliminary area from which further investigation is required to identify the actual net depleted areas. Sustainable forest licence holders (plan holders) are required to identify the actual net area depleted by natural causes and provide this information in the annual report depletion base coverage.

The tabular component of the annual report depletion base coverage must also contain the stand listings for the depleted areas as described in Part C, Section 3.2 of the FMPM. All stand listings must correspond directly with the FRI (planning inventory) which was prepared for, and submitted with, the forest management plan under which depletion operations (including natural depletions) have been conducted or have occurred. The tabular attribute information contained in the annual report depletion base coverage is described by the standards in Section 3.2.1.1.

Sustainable forest licence holders (plan holders) must provide the digital annual report depletion base coverage with Part Two of the annual report submission as described by the timelines in Section 3.4.

3.1.1.2 *Requirements for the Annual Report Silvicultural Treatment Base Coverage*

The annual report silvicultural treatment base coverage contains information which identifies the locations and areas within the forest management unit that received a silvicultural treatment (including activities on tree improvement areas) during the fiscal year of operations. This coverage contains polygon features which identify the following silvicultural treatments or activities:

a) Site Preparation Treatment Method
b) Regeneration Treatment Method
c) Tending Treatment
d) Protection Treatment

The tabular component of the annual report silvicultural treatment base coverage must also contain the stand listings for the silvicultural treatments as described in Part C, Section 3.2 of the FMPM. All stand listings must correspond directly with the FRI (planning inventory) which was prepared for, and submitted with, the forest management plan under which the silvicultural treatments have been conducted. The tabular attribute information contained in the annual report silvicultural treatment base coverage is described by the standards in Section 3.2.1.2.

Sustainable forest licence holders (plan holders) may choose to provide the annual report silvicultural treatment information on two separate coverages to facilitate clarity and ease of use. The digital annual report silvicultural treatment base coverage information must be provided with Part One of the annual report submission as described by the timelines in Section 3.4.

3.1.1.3 *Requirements for the Annual Report Road Construction/Use Base Coverage*

The annual report road construction/use base coverage contains information which identifies newly constructed primary and secondary roads and existing roads which have been abandoned or on which access has been restricted during the fiscal year of operations. This coverage also contains point features which identify the locations of forest access road restrictions such as culvert removals, ditches, burms, signs, etc. The annual report road construction/use base coverage contains linear spatial features which identify the road centre-lines for the following road activities:

a) New Forest Access Road Construction
b) Abandoned Forest Access Roads
c) Forest Access Roads with Access Restrictions

The tabular attribute information component of this coverage is described by the standards in Section 3.2.1.3. Sustainable forest licence holders (plan holders) must provide the digital annual road construction/use information with Part Two of the annual report submission as described by the timelines in Section 3.4.

3.1.2 Requirements for Composite Scale Annual Report Activities – Digital Map Products

Sustainable forest licence holders (plan holders) are required to provide two digital map products which contain a summary of the annual report activities information at a composite scale:

1) Composite Scale Annual Report – Depletions and Roads
2) Composite Scale Annual Report – Silvicultural Treatments

The depletions and roads digital map product must be composed of planimetric base features information, planning inventory information, and the information from both the annual report depletion base coverage and the annual report road construction/use base coverage. The silvicultural treatments digital map product must be composed of planimetric base features information, planning inventory information, and the information from the annual report silvicultural treatment base coverage.

The MNR must ensure that SFL holders (plan holders) are provided with the planimetric base features information needed to produce the composite annual report activities coverages. The requirements for planimetric base features information are described in Part B, Section 3.0.

Sustainable forest licence holders (plan holders) must utilize the applicable planning inventory prepared for the forest management plan under which forest operations were planned and reported for the purpose of creating the composite scale, digital map products.

The composite scale, digital map products must consist of reproducible print format files that can be printed, reproduced, and used by both the MNR or the SFL holders (plan holders) at any time. The requirement to provide digital map products ensures that SFL holders (plan holders) and the MNR have the ability to reproduce the same hardcopy map at any time (i.e., can portray the same thematic and reference features at the same scale). There are several acceptable reproducible print formats that SFL holders (plan holders) may utilize to create the composite annual report activities digital map products, as described by the conditions in Section 3.5.

The reproducible print format files are the digital equivalent of the composite scale hardcopy map requirements identified in the *Mapping Requirements and Standards Manual for Forest Management Planning Technical Specifications* for Map 16 – (Annual Report Depletion Map) and Map 17 – (Annual Report Renewal, Tending and Protection Map). The replacement of the hardcopy map requirements for Map 16 and Map 17 with digital information is further described in Part E of the FIM.

3.2 Standards for Annual Report Spatial Activities Information

This section describes the standards for annual report activity base coverages and the associated tabular information (Section 3.2.1), and the composite scale annual report activities – digital map products (Section 3.2.2).

3.2.1 Standards for Annual Report Activity Base Coverages

The spatial standards for creating annual report spatial activities coverages are the same as for the FRI information which are described in Part B, Section 5.1 of the

FIM. The annual report depletion base coverage, the annual report silvicultural treatment base coverage, and the annual report road construction/use base coverage must use only the applicable information/features from the existing FRI (planning inventory) coverages or roads base feature coverages as the base fabric information. Therefore, the standards applied to the annual report spatial activities information (coverages) should be consistent with the spatial standards for these coverages.

The positional accuracy target for road centre-line features and road point features should be within 10 metres and must always be accurate to within 100 metres. Verification of positional accuracy should be done in a manner that is consistent with the method which was applied in establishing the geographic position and location of a spatial feature.

3.2.1.1 *Standards for the Annual Report Depletion Base Coverage*

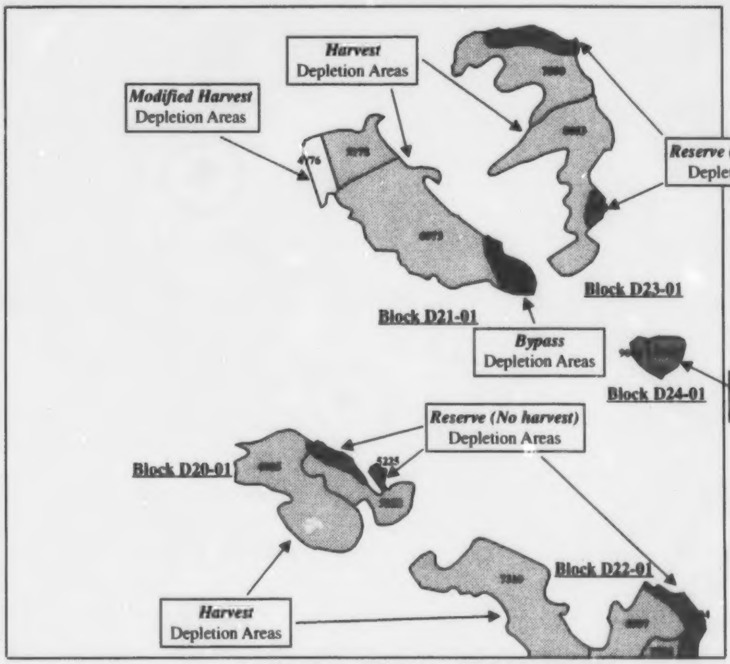
The annual report depletion base coverage contains productive forest polygons which have been depleted by harvest, reserve, bypass, or natural causes. All depletion polygons are given a unique polygon identification number (Depletion Polygon ID) based on the type of depletion and the original productive forest polygon number from the composite planning inventory which was prepared for the forest management plan in which the depletions are being reported.

Only the productive forest polygons affected by the depletions are transferred from the planning inventory to the annual report depletion base coverage. The boundaries of the depletion polygons, by depletion type and based on the original productive forest polygon boundaries, are then created in the annual report depletion base coverage. Figure D-1 shows an example of an annual report depletion base coverage.

A stand listing must be generated for each depletion polygon and contains tabular information that is maintained as part of the spatial coverage. The stand listing contains the following information:

Depletion Polygon ID
Depletion Type
Depletion Polygon Area
Operating Block ID
Productive Forest Polygon Number
Forest Unit/Site Type
Silvicultural Treatment Package ID
Forest Management Plan ID
Area of Concern ID
Silvicultural System
Harvest Method
Logging Method

Figure D-1 An Example of an Annual Report Depletion Base Coverage
2001/2002 Fiscal Year


Harvest
Depletion Areas
Modified Harvest
Depletion Areas
Reserve (No harvest)
Depletion Areas
4776
Block D23-01
Block D21-01
Bypass
Depletion Areas
Block D24-01
Natural (Fire)
Depletion Areas
Reserve (No harvest)
Depletion Areas
5225
Block D20-01
Block D22-01
Harvest
Depletion Areas

Partial Coverage Based on a Single Mapsheet Tile

(The numbers shown in each polygon represent the Depletion Polygon IDs)

Depletion Polygon ID

The depletion polygon ID is a unique number assigned to each depletion polygon which is determined by depletion type and the area of a productive forest stand which was depleted. A depletion polygon may encompass the entire area of the original productive forest stand polygon (based on the applicable planning inventory) or only a portion of the productive forest stand which was depleted. The depletion polygon ID may represent a systematic record number or may be geo-referenced within a mapsheet tile or seamless management unit coverage. The requirements for geo-referencing polygons based on mapsheet tiles are described in Part B, Section 5.1 of the FIM. The depletion polygon IDs shown in Figure D-1 were created using this methodology.

Depletion Type

The depletion type indicates how an area was depleted or how an area planned for depletion was protected or set aside, and must identify one of the following types:

Harvest
Modified Harvest
Reserve – No Harvest Permitted

Bypass – Operability
Bypass – Marketability
Bypass – Other
Natural – Fire
Natural – Insect
Natural – Disease
Natural – Other

Harvest Depletions

Harvest depletions are areas where timber has been harvested for commercial and economic reasons.

Modified Harvest Depletions

Modified harvest depletions are areas where partial or restricted harvesting has occurred for the purpose of protecting a value.

Reserve Depletions

Reserve depletions are areas associated with the protection of values which are often located adjacent to harvested areas. Reserve areas are identified through AOC planning and are areas in which no harvest is permitted.

Bypass – Operability Depletions

Bypass – operability depletions are areas which have been passed over (bypassed) when harvest operations were conducted due to biological or physical limitations such as steep slopes, shallow soils, high water table, or surface water conditions, etc. These areas must be reclassified when updating the forest resources inventory information into the appropriate productive forest modifier and management consideration information.

Bypass – Marketability Depletions

Bypass – marketability depletions are areas which were bypassed either because, no economical markets existed for some or all of the trees species, or an economical harvest could not be achieved due to the characteristics of the forest stands. Where applicable, these areas must be reclassified, or the forest stand description information must be revised, when updating forest resources inventory information.

Bypass – Other Depletions

Bypass – other depletions are areas which were bypassed due to reasons other than operability or marketability reasons. The reasons for bypassing these areas must be maintained as part of the SFL holder's (plan holder's) records and information.

Natural Depletions

Natural depletion areas must be identified based on the type of natural disturbance, as either; fire, insect, disease, or other. Examples of other natural depletions include ice damage, blowdown, etc.

Depletion Polygon Area

The actual depleted area is stored as a spatial attribute in the annual report depletion coverage. The depletion polygon area is calculated by converting and rounding the actual area stored in square metres to the nearest 1/10 (0.1) hectare.

Operating Block ID

The operating block ID is a unique number or label assigned to each depletion or silvicultural treatment area, which contains one or more productive forest stands or depletion polygons. Operating block IDs are assigned during the selection of planned harvest areas or selection of areas for silvicultural treatments during forest management plan preparation. Therefore, the operating block ID for depletion and silvicultural operations identified on the five-year planned operations maps, the AWS operations maps, and the annual report depletion base coverage should be consistent.

Productive Forest Polygon Number

The productive forest polygon number is the original polygon number from the FRI coverage (planning inventory) which was prepared for the forest management plan from which the harvest operations were planned and conducted. The productive forest polygon number must correspond to the polygon numbers contained in the stand listings for the five-year planned operations, the annual work schedules and the associated map product requirements as identified in Part E of the FIM.

Forest Unit/Site Type

The forest unit/site type represents the forest unit/site type combination identified in the silvicultural ground rules of an approved forest management plan and the forest operations prescription in an AWS. Naturally depleted areas and bypass areas should reflect the forest unit/site combination that was assigned to the productive forest area prior to the disturbance.

Silvicultural Treatment Package ID

The silvicultural treatment package ID identifies the selected silvicultural treatment package that was applied to the area and references a specific silvicultural ground rule in an approved forest management plan. The chosen silvicultural treatment package also identifies the forest operations prescription which was confirmed and certified in the AWS or that was applied in accordance with a silvicultural ground rules in an approved plan (subsequent to a revision made to the AWS). Areas that have been naturally depleted may, or may not, have an assigned silvicultural treatment package until they have been considered and scheduled for a silvicultural treatment.

Forest Management Plan ID

The forest management plan ID identifies the plan term for the approved plan in which the forest unit/site type and the silvicultural treatment package were determined.

Area of Concern ID

If an AOC is adjacent to, or located within, a depleted area, the area of concern ID which was assigned during operational planning and in the AWS must be identified in the annual report depletion base coverage. The area of concern ID in the annual report depletion base coverage or the annual report silvicultural treatment base coverage should be consistent with the AOC as identified in the Areas Selected for Operations Maps described in Part E of the FIM.

The remaining tabular information (silvicultural system, harvest method, and logging method) are not required for reserve, bypass, or natural depletion types.

Silvicultural System

The silvicultural system must be identified as either Clearcut, Shelterwood, or Selection.

Harvest Method

The harvest method identifies the type of harvest operation that was applied. Harvest method types must be identified as one of the following:

Clearcut Conventional
Modified Clearcut/Strip Cut/Block cut/Patch/First Pass/Seed Tree
CLAAG/HARO/HARP
Commercial Thinning/Spacing
Shelterwood – Prep Cut
Shelterwood – Seed Cut
Shelterwood – First Removal
Shelterwood – Final Removal
Selection – Improvement
Selection – Conventional

Sustainable forest licence holders (plan holders) are required to maintain and keep as part of their records and information other descriptive information which may be relevant to the harvest method applied, as recorded and described in the silvicultural ground rules for the plan.

Logging Method

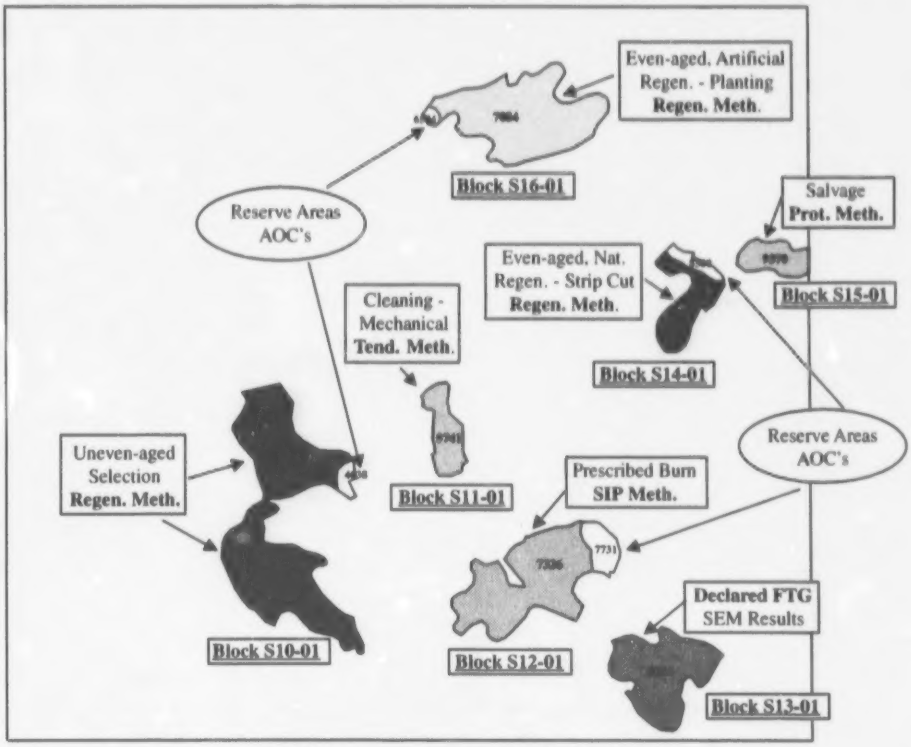
The logging method must be identified as one of the following:

Full Tree
Tree length
Cut to Length/Short Wood

3.2.1.2 *Standards for the Annual Report Silvicultural Treatment Base Coverage*

The annual report silvicultural treatment base coverage contains productive forest polygons which have received a silvicultural treatment during the fiscal year of operations. Figure D-2 illustrates an example of an annual report silvicultural treatment base coverage.

Figure D-2 An Example of an Annual Report Silvicultural Treatment Base Coverage
2001/2002 Fiscal Year


Even-aged, Artificial Regen. - Planting **Regen. Meth.**
Block S16-01
Reserve Areas AOC's
Salvage **Prot. Meth.**
Even-aged, Nat. Regen. - Strip Cut **Regen. Meth.**
Block S15-01
Cleaning - Mechanical **Tend. Meth.**
Block S14-01
Reserve Areas AOC's
Uneven-aged Selection **Regen. Meth.**
Block S11-01
Prescribed Burn **SIP Meth.**
7731
Declared FTG SEM Results
Block S10-01
Block S12-01
Block S13-01

Partial Coverage Based on a Single Mapsheet Tile

(Numbers shown in each polygon represent the silvicultural treatment Polygon IDs)

The FRI coverage (planning inventory), which was prepared for the plan under which the annual operations were conducted, must be used as the base reference for the annual report silvicultural treatment base coverage. Only the productive forest polygons affected by the silvicultural treatments are transferred from the planning inventory to the annual report silvicultural treatment base coverage. The boundaries of the silvicultural treatment polygons, by silvicultural treatment type, in reference to the original productive forest polygon boundaries in the planning inventory, are then created in the annual report silvicultural treatment base coverage.

A stand listing must be generated for each silvicultural treatment polygon and contains tabular information that is maintained as part of the spatial coverage. The stand listing contains the following information:

Silvicultural Treatment Polygon ID
Silvicultural Treatment Polygon Area
Operating Block ID
Productive Forest Polygon Number
Forest Unit/Site Type
Silvicultural Treatment Package ID
Forest Management Plan ID
Area of Concern ID
Free-to-Grow Indicator
Silvicultural Treatment Category
Site Preparation Method
Regeneration Treatment Method
Tending Method
Protection Type

The definitions for Operating Block ID, Productive Forest Polygon Number, Forest Unit/Site Type, Silvicultural Treatment Package ID, Forest Management Plan ID, and Area of Concern ID information, are the same in the annual report silvicultural treatment base coverage as for the annual report depletion base coverage. This information is described in Section 3.2.1.1.

Silvicultural Treatment Polygon ID

The silvicultural treatment polygon ID is a unique number assigned to each silvicultural treatment polygon which is determined by silvicultural treatment type and the area of the productive forest stand which was treated. The silvicultural treatment category, site preparation method, regeneration method, tending method, and protection type identify the various types of silvicultural treatments. A silvicultural treatment may encompass the entire productive forest stand area or only part of the area. The silvicultural treatment polygon ID may represent a systematic record number or may be geo-referenced within a mapsheet tile or seamless management unit coverage. The requirements for geo-referencing polygons based on mapsheet tiles are described in Part B, Section 5.1 of the FIM. The silvicultural treatment polygon IDs shown in Figure D-2 were created using this methodology.

Silvicultural treatment polygons must be created based on the most recent treatment that was applied to a productive forest stand during the fiscal report year. For example, if a site preparation treatment and an artificial regeneration treatment have been applied to the same area in the same fiscal year, the silvicultural treatment polygon will be created based on the artificial regeneration treatment (most recent treatment) applied. The site preparation method will then be recorded as part of the stand listing tabular attribute information that is attached to the same silvicultural treatment polygon ID. If the area that was site prepared is considerably different from the area that received the artificial regeneration treatment, two silvicultural treatment polygons must be created (one for the artificial regeneration treatment and one for the difference in area of the site preparation treatment). Each silvicultural treatment polygon (record) will have the same site preparation method identified in the stand listing.

Silvicultural Treatment Polygon Area

The actual area treated is stored as a spatial attribute in the annual report silvicultural treatment base coverage. The silvicultural treatment polygon area is calculated by converting and rounding the actual area stored in square metres to the nearest 1/10 (0.1) hectare.

Free-To-Grow Indicator

The free-to-grow indicator identifies those productive forest areas which received a silvicultural effectiveness monitoring survey during the year of operations and have been assessed as free-to-grow, based on achieving the regeneration standards described in the appropriate forest management plan. Productive forest areas which are determined as free-to-grow must receive a complete, updated productive forest stand description as described in Part B, Section 5.0 and Part D, Section 4.0 of the FIM. The updated forest stand description will be applied to the stewardship inventory collection or the planning inventory collection as described in Part B, Section 5.0.

Silvicultural Treatment Category

The silvicultural treatment category attribute identifies the silvicultural treatment as one of the following:

Regular
Retreatment
Supplemental

The silvicultural treatment category must correspond to the summarized information identified in the annual report tabular information requirements for Table AR-6, Table AR-6a and Table AR-6b, as described in Part D, Section 2.0.

Site Preparation Method

If an area was site prepared for a regeneration treatment during the year of operations, one of the following methods must be chosen:

Mechanical
Chemical
Prescribed Burn

Regeneration Treatment Method

If a regeneration treatment was applied to an area during the year of operations, then one of the following regeneration treatment methods must be identified:

Uneven-aged – Selection Cut
Even-aged – Natural Regeneration – Clearcut
Even-aged – Natural Regeneration – Strip Cut
Even-aged – Natural Regeneration – Seed Tree Cut
Even-aged – Natural Regeneration – Uniform Shelterwood Seed Cut
Even-aged – Artificial Regeneration – Planting
Even-aged – Artificial Regeneration – Seeding – Direct
Even-aged – Artificial Regeneration – Seeding – Direct – With Site Preparation
Even-aged – Artificial Regeneration – Scarification

Tending Method

If an area received a tending treatment during the year of operations, then the tending method must be identified as one of the following:

Cleaning – manual
Cleaning – chemical – ground
Cleaning – chemical – aerial
Cleaning – mechanical
Cleaning – prescribed burn
Cleaning – slash pile burning
Spacing, pre-commercial thinning, improvement cutting – even-aged
Spacing, pre-commercial thinning, improvement cutting – uneven-aged
Cultivation
Pruning

Protection Type

If an area was protected during the year of operations, then the type of protection treatment must be identified as one of the following:

Accelerated harvest
Salvage

Manual protection
Ground insecticide
Aerial spraying

All salvage activities must be reported as a protection type.

3.2.1.3 *Standards for the Annual Report Road Construction/Use Base Coverage*

The annual report road construction/use base coverage contains linear spatial features which represent the centre-line of newly constructed roads, roads where access restrictions are imposed or lifted, and roads which have been abandoned in the fiscal year of operations. For roads where access restrictions have been imposed, the type of restriction and the location of the restriction must be identified as points on this coverage. Figure D-3 shows an example of an annual report road construction/use base coverage.

Each road linear (centre-line) feature or road point feature must have the following tabular attributes:

Road Feature ID
Road Feature Type
Road Access Type
Road Custodian
Road Segment Length (kilometres)
Road Operation Type
Road Restriction Type

Road Feature ID

The road feature ID attribute is an assigned number, label or name which is applied to the road segment feature (linear feature) or road point feature affected by the road operation. This value must be unique for each road segment or road point and can be a sequentially assigned value such as a record number, or can consist of a label or name which has been assigned by the user. In either case, the unique road feature ID must be consistent with the road ID referenced in the road use management information contained in the approved forest management plan, the AWS, and subsequent annual reports.

Road Feature Type

The road feature type identifies the type of spatial feature as either a linear or point feature.

Road Access Type

The road access type attribute identifies the type of forest access road, in terms of the road use management strategy approved in the forest management plan, as one of the following:

Primary Forest Access Road
Secondary Forest Access Road

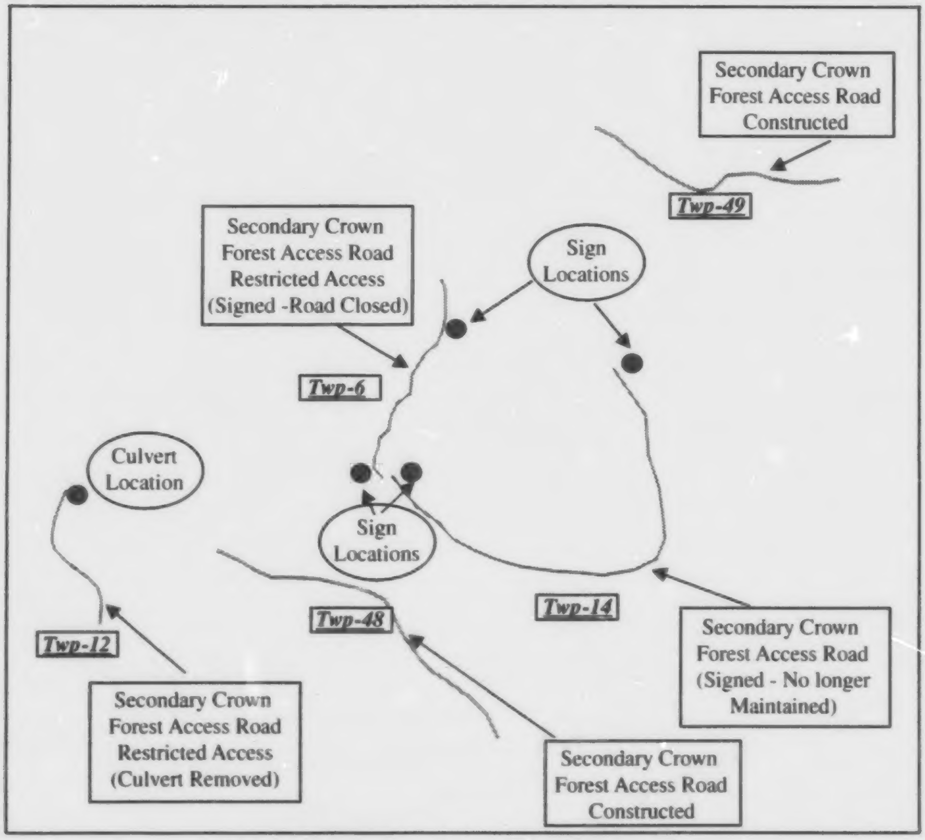
The definitions for these road access types are provided in the FMPM.

Road Custodian

The road custodian attribute identifies whether or not the SFL holder (plan holder) is the custodian (party responsible) for maintaining roads and roads information, and only applies to the roads which were active for the fiscal year of operations being reported upon. One of the following options must be identified for this attribute:

SFL holder (plan holder)
Other

Figure D-3 An Example of an Annual Report Road Construction/Use Base Coverage
2001/2002 Fiscal Year


Secondary Crown Forest Access Road Constructed
Twp-49
Secondary Crown Forest Access Road Restricted Access (Signed -Road Closed)
Sign Locations
Twp-6
Culvert Location
Sign Locations
Twp-12
Twp-48
Twp-14
Secondary Crown Forest Access Road (Signed - No longer Maintained)
Secondary Crown Forest Access Road Restricted Access (Culvert Removed)
Secondary Crown Forest Access Road Constructed

Partial Coverage Based on a Single Mapsheet Tile

Road Segment Length (kilometres)

For each forest access road affected by forest management operations in the reporting year, the length of the road (referred to as a road segment) affected by road operation type must be entered to the nearest 1/10 (0.1) of a kilometre.

Road Operation Type

The road operation type identifies the action or decision that occurred on the affected road segment and must correspond to one of the following options:

New Construction
Access Restriction
Road Abandonment
Road Restriction Removed/Lifted

Road Restriction Indicator

The road restriction indicator identifies the type of access restriction that was applied to the road segment. One of the following indicators must be chosen if the road operation type attribute is identified as Access Restriction or Road Abandonment:

Signed – Access Restriction
Burm/Ditch – Access Restriction
Gated – Access Restriction
Culvert Removed – Access Restriction
Signed – Abandonment – Not Maintained – Use at own risk
Physical – Abandonment – Scarified/Road/Culverts Removed

3.2.2 Standards for Composite Scale Annual Report Activities – Digital Map Products

The digital map products for the composite scale annual report activities (depletions, silvicultural treatments, and roads) must be produced at a scale suitable for reproduction purposes. The map scale must also be consistent with the composite map scale chosen for the portrayal of similar map features, as described in Part E of this manual. Sustainable forest licence holders (plan holders) must create and provide reproducible print format files for the composite annual report activity maps (Map 16 and Map 17), as described in Part E of this manual.

The *Mapping Requirements and Standards for Forest Management Planning Technical Specifications* provide further details for information required in the digital map products for the composite scale annual report – depletions and roads map (Map 16) and the composite scale annual report – silvicultural treatments map (Map 17).

3.3 Roles and Responsibilities for Annual Report Spatial Activities Information

Sustainable forest licence holders (plan holders) are responsible for confirming that the spatial information provided in accordance with Section 3.0 is consistent with the tabular information created and provided in Section 2.0. For example, the sum of the areas recorded as depleted in the annual report depletion base coverage should be the same as the total areas identified in Table AR-1. These comparisons of spatial information to tabular information should be completed by SFL holders (plan holders) before they submit the required information. The MNR will check that the spatial information is complete and verify the accuracy of the information based on these kinds of comparisons. Small discrepancies due to rounding of areas when comparing annual report tabular information with annual report spatial information should be ignored.

3.3.1 Inventory Base Features and Forest Resources Inventory Updates

Annual report spatial information provides an important source of information for updating inventory base features as they are encountered during the implementation of forest management operations and for updating FRI information required in the stewardship and planning inventories. The MNR must archive the spatial annual report activities information provided by SFL holders (plan holders). This spatial information will be used as a basis for preparing the RPFO.

3.3.2 Other Relevant Information

For the purposes of verifying the spatial annual activities information for accuracy, the MNR may request access to, or provision of, the source data, records and information which were used to create the spatial coverages. The source data, records and information may consist of aerial photographs, supplementary and large scale photography, satellite imagery analysis and global positioning data, surveys, inspections, samples, or other data collected and which were used to create and update the spatial information. The MNR will respect the intellectual property rights of the SFL holder's (plan holder's) source data, records, and information in accordance with Part A, Section 1.4.2. The MNR and the SFL holder (plan holder) will consult with each other to determine the most efficient and cost-effective method to provide this information.

In other cases, the MNR may request access to, or provision of, records and other information that are considered as part of the annual report information. In these cases the MNR and the SFL holder (plan holder) will consult with each other to determine the most efficient and cost-effective method of providing this information.

3.4 Timelines for Annual Report Spatial Activities Information

Sustainable forest licence holders (plan holders) must provide annual report spatial information in accordance with the following timelines based on the requirements for depletions, silvicultural treatments, and road construction/use information, and based on the current two part submission requirements for the annual report.

3.4.1 Depletion and Roads Information

The following information must be provided with Part Two of the annual report which is required on November 15 following the end of the fiscal year in which the forest operations and natural disturbances took place:

a) Annual Report Depletions Base Coverage
b) Annual Report Road Construction/Use Base Coverage
c) Composite Scale Annual Report Depletions and Roads – Digital Map Product

3.4.2 Silvicultural Treatments Information

The following information must be provided with Part One of the annual report which is required on April 15 following the end of the fiscal year in which forest operations took place:

a) Annual Report Silvicultural Treatment Base Coverage
b) Composite Scale Annual Report Silvicultural Treatments – Digital Map Product

3.4.3 First Date of Effect for Annual Report Spatial Activities Information

The first effective date for implementation of the depletion and roads spatial information requirements will be November 15, 2001. This first effective date may require a transition period to account for situations where an FRI (planning inventory) may not have been provided in accordance with Part B, Section 5.2 or 5.3. The first effective date for implementation of the silvicultural treatment spatial information will be April 15, 2002 for activities conducted in the 2001/2002 fiscal year. The full requirements of Section 3.0 must be met for forest operations which are conducted in the 2001/2002 fiscal year and beyond.

3.4.4 Checking For Completeness and Verification for Accuracy

Similar to the annual report tabular information requirements prescribed in Section 2.0, the annual report spatial activities information is considered to be part of the annual report submission. The MNR must check the annual report spatial actvities information for completeness and verify its accuracy within 30 working days of receipt of the information. The MNR will provide a written confirmation of acceptance or a notice of non-acceptance of the annual report spatial activities information to the SFL holder (plan holder) within this 30-day period. This confirmation will be included with the MNR review of the annual report and the annual report tabular information.

If the annual report spatial activities information is not acceptable, then the MNR will provide the SFL holders (plan holders) with a list of the required revisions with the notice of non-acceptance. The required changes, revisions, and corrections must be completed by the SFL holders (plan holders) and delivered to the appropriate MNR District within 30 working days of receiving the written notice of non-acceptance. Revisions must be provided in accordance with the conditions described in Section 3.5.

3.5 Conditions for the Annual Report Spatial Activities Information

Sustainable forest licence holders (plan holders) must prepare and provide the annual report spatial activities information, as described in Sections 3.1 and 3.2, in accordance with the *Technical Specifications for Providing Annual Report Spatial Activities Information*.

The MNR must prepare and provide the annual report spatial coverages of natural disturbances, as described in Section 3.1, in accordance with the *Technical Specifications for Providing Annual Report Spatial Activities Information*.

Sustainable forest licence holders (plan holders) must prepare the composite scale annual report digital map products, as described in Section 3.1 and Section 3.2, in accordance with the *Mapping Requirements and Standards for Forest Management Planning Technical Specifications*.

4.0 SILVICULTURAL EFFECTIVENESS MONITORING SURVEYS

This section describes the information requirements for silvicultural effectiveness monitoring surveys. Part A, Section 2.5 of the FMPM prescribes the requirement to monitor the effectiveness of silvicultural treatments and the effects of forest management operations on forest cover and forest values. Forest management plans describe the methods which will be used to monitor the effectiveness of silvicultural treatments and inspect the implementation of forest operations.

The FIM prescribes the requirement for SFL holders (plan holders) to conduct silvicultural effectiveness monitoring surveys in accordance with subsection 21(1) of the Crown Forest Sustainability Act (CFSA). The *Forest Operations and Silviculture Manual* prescribes the requirement to conduct silvicultural effectiveness monitoring surveys in accordance with the SEMMO to ensure, within a certain level of confidence, that regeneration standards are met.

The FIM prescribes the requirements for SFL holders (plan holders) to maintain and provide information and records pertaining to silvicultural effectiveness monitoring surveys. The FIM also describes the information required for maintaining and updating FRI information using silvicultural effectiveness monitoring survey data and assessments of survey results.

The SEMMO provides guidance and direction regarding acceptable survey methodologies, conducting surveys, collecting data, analyzing and assessing survey data, determining the effectiveness of silvicultural treatments, reporting on the assessment of results, and updating forest resources inventories.

4.1 Requirements for Silvicultural Effectiveness Monitoring Surveys and Information

Sustainable forest licence holders (plan holders) must conduct silvicultural effectiveness monitoring surveys on managed Crown lands in accordance with the monitoring and assessment methods and the forest operations inspection program as described in an approved forest management plan. Sustainable forest licence holders (plan holders) must collect sufficient information to determine if the regeneration standards and/or management standards, as described in the silvicultural ground rules of an approved forest management plan, have been met. Sustainable forest licence holders (plan holders) must also collect information with regard to exceptions monitoring in accordance with an approved forest management plan for the purpose of determining the effectiveness of silvicultural treatments which are exceptions to the silvicultural guides.

The SEMMO describes the methodologies for conducting silvicultural effectiveness monitoring surveys and the process to determine if managed forest stands have achieved the regeneration standards and/or management standards in accordance with the ground rules of an approved forest management plan. When forest stands have achieved these standards in accordance with an approved forest management plan, they are declared free-to-grow (considered as free-growing) and are then updated to reflect their free-growing condition in the applicable FRI (stewardship inventory or planning inventory).

The information collected from silvicultural effectiveness monitoring surveys must be sufficient to provide a comparison with the regeneration standards and/or management standards described in an approved forest management plan. The mandatory information to be collected from silvicultural effectiveness monitoring surveys must also contain sufficient information that can be used to update forest stand description attributes, as described in the forest polygon coverage (see Part B, Section 5.1). Sustainable forest licence holders (plan holders) may utilize any of the survey methodologies described in the SEMMO, providing that sufficient information is collected from the surveys to determine whether regeneration and/or management standards have been met and to update FRI information. The mandatory information which must either be collected from silvicultural effectiveness monitoring surveys or derived from survey data is described in Section 4.2.

Sustainable forest licence holders (plan holders) are required to maintain, in easily retrievable records, the source data collected from each silvicultural effectiveness monitoring survey, regardless of the methodology applied. Sustainable forest licence holders (plan holders) must also maintain, in easily retrievable records, the assessment results of comparing the survey data with the regeneration or management standards for each managed forest area in accordance with the applicable forest management plan.

Sustainable forest licence holders (plan holders) must utilize the results of the silvicultural effectiveness monitoring survey data to update the forest description information required in the stewardship inventory and the planning inventory as described in Part B, Section 5.1. Updates to each of these inventories are required once every five years.

On an annual basis, SFL holders (plan holders) must ensure that the results of the silvicultural effectiveness monitoring survey data have been summarized by forest unit in the applicable annual report tables as described in Part D, Section 2.0. Productive forest stands which have been assessed as free-growing, based on the results of silvicultural effectiveness monitoring survey data, must also be identified in the annual report silvicultural treatment base coverage, as described in Part D, Section 3.0.

Sustainable forest licence holders (plan holders) are not normally required to provide the actual silvicultural effectiveness monitoring survey data. However, the MNR may request the source data collected and/or the assessment of survey data results for specific productive forest areas for the purpose of monitoring certain forest operations or for auditing purposes. Silvicultural effectiveness monitoring information is provided through its incorporation into, and submission of, the following information and information products prescribed by this manual:

- stewardship inventory information
- planning inventory information
- annual report tabular information
- annual report spatial activities information
- RPFO
- specific silvicultural effectiveness monitoring survey results and related survey data as requested by the MNR

4.2 Standards for Silvicultural Effectiveness Monitoring Surveys and Information

The standards for silvicultural effectiveness monitoring information are divided into two groups:

1) Attributes Required for Regeneration and Management Standards
2) Attributes Required for Updating FRI Information

The information required for the assessment of whether regeneration or management standards for a silvicultural ground rule have been met are also used to update the attributes in an FRI.

4.2.1 Information Required for Regeneration and Management Standards

The information required for the assessment of regeneration and management standards, which must be identified as part of the silvicultural ground rules, are primarily based on the silvicultural system applied. As part of the assessment of whether the regeneration or management standards have been met, the following information must be determined and/or verified for forest stands managed under any silvicultural system:

Forest Unit (Past and Present)
Ecosite
Site Class

The standards for forest unit information are described in Part B, Section 5.3.2. The standards for the ecosite and site class attributes are described in Part B, Section 5.1.3.2.2.

The following information must also be identified for regeneration and/or management standards as part of the silviultural ground rules for forest stands managed under the clearcut, shelterwood, and selection silvicultural systems:

Target and Acceptable Tree Species
Minimum Height
Time Frame
Stocking and/or Density
Survey Methodologies

For stands managed under the shelterwood system, this information must also be identified for the understory component of those stands.

The following additional information must also be identified for regeneration and/or management standards as part of in the silvicultural ground rules for forest stands managed under the selection silvicultural system:

Stand Structure
Quality of Residuals

The information required for regeneration and management standards and the process for assessing silvicultural effectiveness are further described in the SEMMO.

Sustainable forest licence holders (plan holders) may identify additional information for the purpose of identifying regeneration or management standards as part of the silvicultural ground rules. Silvicultural effectiveness monitoring surveys must be designed, and the appropriate methods selected, in order to collect sufficient data to assess whether the regeneration or management standards have been met.

Sustainable forest licence holders (plan holders) must collect sufficient information from silvicultural effectiveness monitoring surveys that will enable a comparison/assessment with the silvicultural ground rules, the regeneration standards/management standards, and the applied forest operations prescription in an approved forest management plan for each managed productive forest area.

In many cases, the information required for an assessment of silvicultural effectiveness requires that SFL holders (plan holders) must reference the silvicultural ground rules, regeneration standards/management standards, and forest operations prescriptions from a previous forest management plan. Sustainable forest licence holders (plan holders) must retain and develop linkages for information related to silvicultural ground rules, regeneration standards/management standards, forest operations prescriptions, silvicultural treatments, and forest units/working groups from previous forest management plans for the purpose of tracking silvicultural effectiveness.

The SEMMO provides further direction on silvicultural information tracking. Part C, Section 2.0 of this manual also describes the requirements for maintaining records and information related to tracking silvicultural activities as part of a forest operations prescription.

4.2.2 Information Required for Updating Forest Resources Inventories

If the regeneration and/or management standards, as described in Section 4.2.1, have been met, the information collected from silvicultural effectiveness monitoring surveys must be used to update FRI attributes according to the following cross-referenced list:

Regeneration/Management Standards		**FRI Attributes**
Target and Acceptable Tree Species	→	Species Composition and Working Group
Minimum Height	→	Height
Time Frame	→	Year of Origin
Stocking and/or Density	→	Stocking
Survey Methodologies	→	Source of Data Update
Stand Structure	→	Basal Area Distribution
Quality of Residuals	→	Basal Area Distribution

These FRI attributes form part of the forest stand description information requirements for the forest polygon coverage, as described in Part B, Section 5.1. Sustainable forest licence holders (plan holders) must apply the standards for these forest polygon coverage attributes as they relate to regeneration and management standards when collecting data from silvicultural effectiveness monitoring surveys or when compiling the results of surveys.

Sustainable forest licence holders (plan holders) must also collect FRI information, in addition to the information collected from a silvicultural effectiveness monitoring survey, for productive forest stands which have met regeneration standards and/or management standards and have been declared as free-to-grow. Once a forest stand has been assessed as free-growing and it has met the regeneration standards and/or management standards for a silvicultural ground rule, SFL holders (plan holders) must update all common description attributes and forest stand description attributes required in the stewardship inventory and/or planning inventory. Sustainable forest licence holders (plan holders) must update the FRI information for each productive forest area in accordance with the standards described in Part B, Section 5.1. This may also require a confirmation or adjustment of the spatial area and/or polygon boundary as well as collection of common description and forest stand description attributes, as described in Part B, Section 5.1.

Sustainable forest licence holders (plan holders) will have met the requirements for provision of information from silvicultural effectiveness monitoring surveys when the results of the surveys have been provided:

- annually as part of the annual report tabular information requirements;
- annually as part of the annual report spatial information requirements;
- once every plan term as part of the updates to a stewardship inventory;
- once every plan term as part of the updates to a planning inventory;
- once every plan term as part of the RPFO;
- for specific survey and assessment results as requested by the MNR from time to time for the purpose of compliance monitoring or auditing of forest management planning and operations; and,
- as otherwise described in the SEMMO.

4.3 Roles and Responsibilities for Silvicultural Effectiveness Monitoring Surveys and Related Information

Sustainable forest licence holders (plan holders) are responsible for maintaining all silvicultural effectiveness monitoring data, records, and information from previous plan terms as well as the current plan term for which they are responsible for carrying out such activities. Forest units, regeneration standards, and silvicultural ground rules may change from one forest management plan term to the next. Sustainable forest licence holders (plan holders) must ensure that the regeneration or management standards and the applicable silvicultural survey data, records, and information can be tracked from one forest management plan to the next and must ensure the continuity of this information.

The MNR may request access to, or provision of, source data, records, and information which have been collected from specific surveys for the purpose of monitoring or auditing specific forest operations. Requests for access to, or provision of, source data, records and information may pertain to previous or current forest management plan terms. Sustainable forest licence holders (plan holders) must provide access to, or provision of, the source data, records and information in relation to survey data, analysis of data or the assessment of results, as requested by the MNR.

Requests for silvicultural effectiveness monitoring survey information by the MNR may include, but are not limited to, the following:

- Survey methodologies and analyses employed
- Rationale for the selected survey methodology
- Data collected from initial surveys, samples, or other sources of data collection
- Processes and/or analyses used to assess survey data against the regeneration/management standards
- Tracking of regeneration/management standards, silvicultural ground rules, forest units, or other silvicultural strategy information for specific productive forest areas
- Satellite imagery, large scale photography, supplementary aerial photography, or similar measurement/assessment source

The MNR may enter into arrangements or agreements with SFL holders (plan holders) or third parties for the purpose of updating FRI information prescribed by this manual using past silvicultural effectiveness monitoring or free-to-grow standards.

Sustainable forest licence holders (plan holders) must ensure that silvicultural effectiveness monitoring survey results have been used to update forest resources information, annual report information, and RPFO information, and have been applied in subsequent forest management plans.

4.3.1 Information Related to Monitoring and Assessment

The requirements to establish a monitoring and assessment program are described in Part A, Section 2.5 of the FMPM. The MNR may request access to, or provision of, records and other information with respect to monitoring and assessment (including exceptions monitoring) in accordance with an approved forest management plan. Requests for records and other information must be relevant to determining or verifying the effectiveness of silvicultural treatments which are exceptions to the recommendations in the silvicultural guides or with respect to assessments of regeneration success.

The MNR will provide the SFL holder (plan holder) with the rationale as to how the MNR will use and consider the information requested. Requests for access to, or provision of, records and other information may include documentation maintained as part of the monitoring and assessment program, data collected from surveys and the monitoring and assessment methods employed, analysis and assessment of survey data, and observations or results and conclusions produced from the data collected.

Sustainable forest licence holders (plan holders) must provide the MNR with access to, or provision of, records and other information. Sustainable forest licence holders (plan holders) and the MNR will consult with each other to determine the most efficient and cost-effective means, to provide access to, or provision of the requested information.

4.4 Timelines for Silvicultural Effectiveness Monitoring Surveys and Information

The timelines for the provision of silvicultural effectiveness monitoring survey information are based on the requirements for the following information products prescribed by this manual:

- Stewardship inventory collection (once every five years)
- Planning inventory collection (once every five years)
- Annual report tabular information summaries (annually)
- Annual report silvicultural treatment base coverage (annually)

The MNR may also request silvicultural effectiveness monitoring survey information for specific forest areas or specific surveys at any time. Sustainable forest licence holders (plan holders) must normally provide specific silvicultural effectiveness monitoring survey information within 10 working days of receiving a request from the MNR.

4.5 Conditions for Silvicultural Effectiveness Monitoring Surveys and Information

When making requests for access to, or provision of, silvicultural effectiveness monitoring survey information, the MNR will consult with SFL holders (plan holders) to determine the most efficient and cost-effective means to accomplish this task.

5.0 FOREST OPERATIONS COMPLIANCE INFORMATION

In 1998, the MNR transferred many of the responsibilities for forest compliance to the forest industry. As of April 1, 1998, the holder of an SFL assumed the responsibility for compliance planning, monitoring, inspection, and reporting. The MNR maintains the responsibilities for verifying inspections, performing audits or spot checks of company inspections, and determining compliance actions and enforcement. The *Forest Compliance Handbook* describes the various policies and procedures which govern the forest compliance business and operational requirements for the forest operations inspection program.

One of the primary goals of the forest operations inspection program is to provide a standard process and format for recording observations from individual forest operations inspections. This information is required to complete the Annual Report of Forest Operations Inspections conducted by the SFL holder (plan holder) (Table AR-12.1), the Annual Report of Forest Operations Inspections conducted by the MNR (Table AR-12.2), and the RPFO. Forest operations compliance information is also used to determine trends in non-compliance and to prepare the Provincial Annual Report and the Five-Year State of the Forest Report.

In accordance with the *Guideline for Forest Industry Compliance Planning*, SFL holders (plan holders) are required to conduct forest operations compliance inspections on a regular basis in accordance with an approved compliance plan. Sustainable forest licence holders (plan holders) must develop a five-year strategic compliance plan as well as an annual plan of action (schedule) which must be approved by the MNR as part of a forest management plan and the AWS, respectively. Compliance plans must be prepared by SFL holders (plan holders) in accordance with the *Guideline for Forest Industry Compliance Planning*. The company compliance plan identifies the methods and intensities of inspections, and the frequency and circumstances for which SFL holders (plan holders) must conduct compliance inspections and submit forest operations inspections reports to the MNR.

The MNR must also prepare a district compliance plan for the purposes of monitoring and auditing forest operations and dealing with the results of compliance inspections conducted by SFL holders (plan holders). All reports of non-compliance which are provided by an SFL holder (plan holder) must be dealt with by the MNR. The MNR must identify actions required for every report of non-compliance and will conduct follow-up inspections when required to assess the significance of each compliance infraction.

Information from forest operations inspection reports conducted by SFL holders (plan holders) and from forest operations inspection reports (audits, spot check investigations, and follow-up inspections) conducted by the MNR must be entered and maintained in MNR's FOCIS system. This information system is an integral part of the forest operations inspection program. The requirements and standards described in this section identify the information needed to update and maintain forest operations inspection report information in FOCIS information system.

5.1 Requirements for Forest Operations Compliance Information

Sustainable forest licence holders (plan holders) must conduct an inspection(s) of all forest operations carried out on Crown lands plan and must provide the information in digital form for each forest operations inspection to the MNR at specific times in accordance with an approved compliance plan. The *Forest Compliance Handbook* also describes the various types and stages of forest operations inspections (completed, in-progress, follow-up, partial, etc.) and the requirement to provide a report in each case. The digital information required in a forest operations inspection report must be provided to the MNR District Office responsible for approving and monitoring the implementation of forest management operations conducted by the SFL holder (plan holder).

Sustainable forest licence holders (plan holders) must provide digital information which can be imported directly into FOCIS information system. They may use FOCIS for preparing and maintaining information in forest operations inspection reports. Use of FOCIS by SFL holders (plan holders) is discretionary. However, SFL holders (plan holders) must provide all forest operations inspection information to the MNR in a specified digital format as described in the conditions in Section 5.5.

Similarly, the MNR must provide SFL holders (plan holders) with information in digital form from forest operations inspection reports (audits, spot checks, investigations, and follow-up inspections) conducted by the MNR. The digital format requirements for providing forest operations inspection information conducted by the MNR are also described in the conditions in Section 5.5.

The requirements for the provision of digital information for all forest operations inspections reports which are conducted by SFL holders (plan holders) will be met when the information has been entered into the FOCIS information system and when the information has been checked for completeness and verified for accuracy. The MNR must, therefore, provide confirmation to the SFL holder (plan holder) that the digital information submitted by the licence holder (plan holder) has been checked, verified, and entered into FOCIS.

SFL holders (plan holders) must provide digital information for the purpose of submitting forest operations inspection reports to the MNR in one of two ways:

1) A digital copy of the FOCIS databases (containing the mandatory information for individual forest operation inspection reports) which were created using FOCIS.
2) A digital file in a specified format which is described by the conditions in Section 5.5 and which can be directly imported into FOCIS.

Hardcopies of individual compliance inspection reports will no longer be accepted. Sustainable forest licence holders (plan holders) and the MNR must provide each other with digital information in accordance with Section 5.0. The standards, described in Section 5.2, identify the mandatory information required in a forest operations inspection report.

Subsequent to the implementation of the FIM, the requirements for submission of forest operations inspections reports will be interpreted as the requirement to provide digital information prescribed by Section 5.0 of this manual. This implementation requirement affects and complements the direction in the following documents:

- *Forest Compliance Handbook* – all policies and procedures related to the Forest Operations Inspection Program
- The *Guideline for Forest Industry Compliance Planning*
- Approved Compliance Plans (which includes MNR District compliance plans and Company – SFL holders plans) and their implementation through forest management plans and AWSs
- Conditions in SFLs that pertain to the provision of forest operations compliance inspection information

The submission of digital information in accordance with Section 5.0 does not supercede the requirements for signed and approved inspection reports (sign off) as described in the *Forest Compliance Handbook*. The conditions described in Section 5.5, and the technical specifications prescribed by those conditions, may direct the procedures required for electronic approval and sign-off of digital forest operations inspection report information.

5.2 Standards for Forest Operations Compliance Information

For each case of compliance or non-compliance, SFL holders (plan holders) must provide a mandatory set of attributes which can be imported directly into FOCIS. The mandatory information is divided into three categories: Identification Data, Operation and Operational Activity Data, and Checklist Item Data.

5.2.1 Identification Data

This data provides details regarding who conducted the inspection, the type of inspection, method of inspection, the date and fiscal year of the inspection and operations, and other pertinent information such as permits, licences, and related legislation. The mandatory identification data which must be provided in digital form with each forest operation inspection report is as follows:

Inspector Name

Forest Management Unit/SFL Licence Number

Overlapping Licence and/or Approval Number

Other applicable permits, licences, or authorizations in accordance with or under existing legislation such as:

- Aggregates Act
- Public Lands Act
- Lakes and Rivers Improvement Act
- Other Acts and Regulation

Location
- Township/Base Map Number
- Lot, Concession, etc.

Report Date
- Date of Inspection
- Fiscal Year

Inspection Type
- Start-up
- In-progress
- Completed
- Follow-up
- Unplanned
- Verification
- Final

Method
- Ground
- Aerial
- Remote Sensing
- Ground and Aerial
- Other

5.2.2 Operation and Operational Activity Data

This data identifies the primary forest management operations of access, harvest, renewal, maintenance, and protection, and their corresponding operational activities that were conducted and inspected. For example, cutting, wasteful practices, wood measurement/movement, fire prevention, and general harvest operations are examples of operational activities related to a harvest operation.

The mandatory digital operation and operational activity data which must be provided with each forest operation inspection report is as follows:

Operation Type
- Access
- Harvest
- Renewal
- Maintenance
- Protection

Sub-operation or Sub-activity Type (e.g., for Harvest Activity)

- Cutting
- Wasteful Practices
- Wood Measurement/Movement
- Area of Concern
- Fire Prevention
- General/Other

5.2.3 Checklist Item Data

This data refers to a list of items/considerations and infraction types that are normally identified for a specific operation and operational activity. The checklist item data required for each operation and operational activity are described in Procedure ENF 22.02.02 in the *Forest Compliance Handbook*. The checklist items vary, depending on the forest management operation and the operational activity which was conducted and inspected. Once specific items have been identified (check-marked) for each operational activity, a set of mandatory information is required to complete the inspection information.

Sustainable forest licence holders (plan holders) who utilize FOCIS are prompted for the mandatory information that must be provided based on the checklist items identified (check-marked) and the operational activity on which they are reporting. Sustainable forest licence holders (plan holders) who utilize FOCIS must complete the mandatory information/data items as identified by the various data entry and validation screens contained within FOCIS. They must refer to the on-line documentation maintained as part of FOCIS regarding mandatory and optional entry of information.

Sustainable forest licence holders (plan holders) who do not use FOCIS must refer to a subset of the on-line documentation, which is contained in the technical specifications as prescribed by the conditions in Section 5.5, which identifies and explains the mandatory checklist item information and mandatory forest operations inspection information required for each forest management operation and operational activity.

5.3 Roles and Responsibilities for Forest Operations Compliance Information

Sustainable forest licence holders (plan holders) are responsible for completing an inspection of forest operations and providing the digital information in accordance with an approved compliance plan that has been prepared in accordance with the *Guideline for Forest Industry Compliance Planning*. For each forest operations inspection, SFL holders (plan holders) must confirm that the mandatory data requirements and standards have been met in accordance with Sections 5.1 and 5.2.

The MNR must ensure that the digital information provided by SFL holders (plan holders) is checked for completeness and verified for accuracy. The check for completeness and verification for accuracy will consist of, but is not be limited to, the following:

- The minimum and mandatory data requirements and standards for Identification Data, Operation and Operational Activity Data, and Checklist Item Data have been completed and provided in accordance with the standards described in Section 5.2, the on-line documentation in FOCIS, FOCIS validations, and further standards as described in the technical specifications
- The digital data and information can be directly imported into FOCIS as well as the provincial Compliance Information System (CIS) (i.e., the completion of this check requires that MNR staff submit the FOCIS information into the provincial CIS for final validation of report information)
- A complete forest operations inspection report (hardcopy) can be produced using FOCIS
- The comments and rationale which are provided as part of the forest operations inspection report information are sufficient to determine the extent and significance of each instance of non-compliance
- The forest operations inspection information has been received in accordance with the approved company compliance plan (based on the *Guideline for Forest Industry Compliance Planning*) and in accordance with the timelines described in the *Forest Compliance Handbook*
- The reference and location to source data, information, and records which have been used in the preparation of the forest operations inspection report information, is complete and traceable
- In some cases, verification of the ground observations and the information related to those observations

The MNR may require and take the same amount of time to check the information for completeness and verify its accuracy as the SFL is permitted to file a report of compliance or a report of non-compliance. The MNR must provide the SFL holder (plan holder) with confirmation that the digital forest operations inspection information has been checked for completeness and verified for accuracy.

The MNR is responsible for completing forest operations inspection reports (based on audits, spot checks, investigations, and follow-up inspections they conduct) and for providing the digital information to SFL holders (plan holders) in accordance with an approved district compliance plan. The MNR will ensure that the mandatory information identified in FOCIS has been completed.

5.3.1 Source Data, Records, and Information Related to Forest Operations Compliance Inspections

The MNR may request access or provision of source data, records, and information which were used by the SFL holder (plan holder) when an inspection took place or when completing the inspection report. Requests for source data, records and information may include, but are not limited to, the following:

- Maps, drawings, sketches
- Forest management plan/AWS/Forest operations plan amendments or revisions
- Ground photographs, videos
- Additional notes, records, observations
- Aerial photographs, satellite imagery, large-scale photography, or supplemental aerial photography
- Information related to monitoring and assessment in accordance with an approved forest management plan (Part A, Section 2.5 of the FMPM describes the requirements to describe monitoring and assessment programs in forest management plans. Part C, Section 3.0 of the FMPM describes the MNR requirements to summarize the results of monitoring, through forest operations inspections, as part of the annual report.)
- Other background information (digital and/or hardcopies), inspections, surveys, or samples which may contribute to information relative to a forest operations inspection report

Depending on the relevance of the source data, records, and information to the forest operations inspection report and any subsequent or follow-up investigations conducted by the MNR, the MNR may determine that the information is required as part of the forest operations inspection report and compliance records. In this case, the MNR will consult with the SFL holders (plan holders) to obtain such data, records, and information and determine the confidentiality, sensitivity, or intellectual property rights in obtaining and using this information.

The source data, records and information will normally be treated as the intellectual property of the SFL holder (plan holder) who provided it. Source data, records, and information which have been provided to the MNR will not normally be considered as part of a forest operations inspection report completed by the SFL holder (plan holder) and, therefore, will normally not be made available to the public. The MNR will comply with the FIPPA when making requests for access to, or provision of, source data, records, and information and in their subsequent use of that information. Source data, records, and information will be treated in accordance with Part A, Section 1.4.2 of this manual.

5.3.2 Availability of the FOCIS Information System

The MNR will provide SFL holders (plan holders) with a copy of the latest version of FOCIS upon request. Use of FOCIS information by SFL holders (plan holders) may be subject to copyright provisions by the Queen's Printer for Ontario for the application or similar copyright provisions for the software required to run FOCIS.

Once FOCIS is being utilized by an SFL holder (plan holder), the MNR must ensure that SFL holders (plan holders) are provided with updates to the information system along with updates to the on-line support documentation and technical specifications. Updates to FOCIS and on-line support are available to registered SFL holders (plan holders) through the MNR's internet site.

5.3.3 Availability of FOCIS Information

Forest operation inspection reports, which are produced using FOCIS, are normally available for public inspection. FOCIS also allows for the maintenance of additional information that may assist compliance inspectors, SFL holders (plan holders), and MNR staff with interpretation, rationalizing observations, and justifying actions within the reported results. This additional information, which is maintained as part of the forest operations inspection report record, is normally considered as confidential information and is not considered available for public inspection. The MNR may make decisions regarding the availability of certain information contained in a forest operations inspection report based on the confidentiality or sensitivity of that information with respect to FIPPA or to ensure the protection of natural resources and values.

5.3.4 Data, Records, and Archiving of Information

Digital forest operations inspection reports, and source data, records, and information must be archived on retrievable computer media by both SFL holders (plan holders) and the MNR.

5.4 Timelines for Forest Operations Compliance Information

The timelines for provision of digital forest operations inspection report information described in this section apply to both SFL holders (plan holders) and the MNR. Digital forest operations inspection reports must be provided at different times depending on the following direction:

a) The frequency and timelines (inspection schedules) described in the company and/or district compliance plans; the strategies identified in the approved forest management plan; and the schedule of operations identified in an approved AWS related to the submission of forest operations inspection reports
b) The timelines described in the *Forest Compliance Handbook* – specific to Policy ENF 22.02.01 and Procedure 22.02.02
c) The timelines described in the *Guideline for Forest Industry Compliance Planning*

Based on this direction, digital forest operations inspection report information must be provided by:

1) SFL holders (plan holders) to the MNR according to the following timelines:

   - Within 10 working days of when a forest operations inspection has been completed
   - Within five working days of determining that there is a situation of non-compliance
   - Any other time as specified in, or directed by, an approved company compliance plan

2) The MNR to SFL holders (plan holders) according to the following timelines:

   - Within 10 working days of when a forest operations inspection was undertaken (completed)
   - Within five working days of completing an inspection related to a situation of non-compliance
   - Any other time as specified in, or directed by, an approved MNR District compliance plan

In addition to these timelines, digital information required for "in progress" reports, as conducted by SFL holders (plan holders), must be provided for the following harvest operation situations and conditions:

- When a harvest operation exceeds 500 hectares (in which similar operating conditions have occurred in a contiguous area), and within the timelines described for completed operations, a situation of non-compliance or in accordance with an approved compliance plan.

- When a harvest block exceeds 150 hectares (in which different operating conditions exist and/or in which the harvest block is physically separated from each other), and within the timelines described for completed operations, a situation of non-compliance or in accordance with an approved compliance plan.

The timelines for "in progress" digital forest operations inspection reports apply to SFL holder (plan holders). The MNR must conduct audits, spot checks, investigations, or follow-up inspections and provide digital forest operations inspections reports within the timelines described for completed operations, situations of non-compliance, or in accordance with an MNR district compliance plan.

These timelines are described in Procedure ENF 22.02.02 in the *Forest Compliance Handbook*. The timelines for providing digital information required in a forest operations inspection report, as prescribed by this manual, do not include notification requirements within 24 hours in cases where a Significant or Very Significant situation of non-compliance is determined. Digital requirements for information, prescribed by this manual must not affect the communication process and transfer of non-digital information (verbal communication and discussions) as directed by the *Forest Compliance Handbook*, the *Guideline for Forest Industry Compliance Planning*, and the need for mutual understanding and consultation.

5.5 Conditions for Forest Operations Compliance Information

Sustainable forest licence holders (plan holders) and the MNR must provide each other with digital forest operations inspection report information in the format as specified in the *Technical Specifications for Providing Forest Operations Inspection Report Information*. The technical specifications describe the required formats for digital information that can be electronically imported into, and exported from, FOCIS.

The technical specifications may also prescribe the process and protocols required for electronic data transfer of FOCIS information between the MNR and SFL holders (plan holders). The electronic data transfer process and protocol may identify the required formats for data, media, file transfer, confirmation, receipt, and quality control of transferred data, electronic signature and approval protocol (sign-off), and security and/or confidentiality procedures.

PART E INFORMATION AND INFORMATION PRODUCTS FOR FOREST MANAGEMENT PLANNING MAPS

1.0 INTRODUCTION

The Environmental Assessment (EA) Board's Decision on the Ministry of Natural Resources' (MNR) *Class Environmental Assessment for Timber Management on Crown Lands in Ontario* (Timber EA) identified the requirements to create and use maps to convey forest management planning information. Several Terms and Conditions (T & C) of the Timber EA and, correspondingly, the *Forest Management Planning Manual* (FMPM) provided specific direction regarding map contents and the availability of maps at different stages of plan development, implementation, and reporting.

Term and Condition #13, for example, states that:

> *"MNR shall provide various maps to assist public understanding of timber management planning. All such maps shall be adequate for the purpose of showing the locations of past and planned operations. These maps shall be easy to read and their format shall be standardized across the Area of the Undertaking".*

In 1996, the MNR produced a document entitled *Mapping Requirements and Standards for Forest Management Planning*. This document provided direction to planning teams on the number, type, and content of maps to be created, and also provided a level of standardization for the information portrayed on maps from one forest management to the next within the Area of the Undertaking (AOU). This document has been used for approximately four years and is considered by planning teams as a de-facto standard when preparing maps for the purpose of forest management planning. As such, Part E of the *Forest Information Manual* (FIM) prescribes the requirements for maps based on the past success and acceptance of this document.

2.0 MAPPING REQUIREMENTS AND STANDARDS FOR FOREST MANAGEMENT PLANNING

Prior to incorporating the requirements of the *Mapping Requirements and Standards for Forest Management Planning* into the FIM, the document was reviewed and revised. The requirements for maps, as prescribed in Part E of the FIM, include these revisions.

The requirements prescribed in Section 2.1 identify the needs for hardcopy maps in accordance with the FMPM. The requirements for maps identified in section 2.1 identify the mandatory maps required for the purpose of preparing, implementing and evaluating a forest management plan and the information required for each map.

2.0.1 Future Considerations for Map Information

Part E identifies the requirements for the creation and provision of hardcopy (paper) maps. In future versions of this manual, the requirement to provide digital geographic information as part of the submission of maps will be considered. In most cases, the provision of digital information cannot replace the use and requirements for hardcopy maps. However, the submission of hardcopies for some map products may be reduced or eliminated, provided that the digital information submitted can be used to correctly and accurately reproduce a hardcopy map when required. Digital map information has several advantages over hardcopy maps in terms of its use and applicability with other information products and information systems.

One example where hardcopy map requirements have been replaced by digital map information within this manual is the requirement to submit annual report spatial activities information as described in Part D, Section 3.0. This requirement for digital information has replaced the requirement to submit hardcopies of the Annual Report Depletion Map (Map 16) and the Annual Report Renewal, Tending and Protection Map (Map 17).

2.1 Requirements for Forest Management Planning Maps

This section identifies the requirements for hardcopy maps and the information required for each map for the purpose of preparing, implementing, and evaluating a forest management plan, in accordance with the FMPM.

The map product requirements are divided into five sections based on the following categories of maps:

Section 2.1.2 Strategic Planning Maps
- required for the 20-year period of the plan

Section 2.1.3 Operational Planning Maps
- required for the five-year term of the plan

Section 2.1.4 Annual Planning Maps and Insect Pest Planning Maps
- required for the annual work schedule (AWS) and protection planning

Section 2.1.5 Report Maps
- required for annual reports and Report of Past Forest Operations (RPFO)

Section 2.1.6 Other Maps
- used for forest management planning purposes

Some of the map products provide detailed operational planning information and decisions while other maps provide a summary of the operational details and are designed for easy reproduction and distribution to the public.

The information created for, and included in, most maps is enhanced, with each successive stage in the development of a forest management plan, as a result of the progression of decisions and public consultation requirements. Therefore, some maps are required to be submitted more than once prior to submission of the final map products that are incorporated into, and approved with, the plan. In some cases, the map information may not change from the previous submission. However, the map must still be made available at specific stages during the public consultation process.

Multiple submissions of the same map apply only to specific strategic planning map (Map 6 – Eligibility Map) and operational planning map (Map 8.0 – Areas Selected for Operations Map; Map 8.1 – Areas Selected for Operations Composite Map; Map 9 – FMP Summary Map) requirements. These requirements are specified in Sections 2.1.2.6, 2.1.3.2, 2.1.3.3, and 2.1.3.4, respectively. Figure E-1 shows the requirements for submission of Map 6 – Eligibility Map, based on the different stages in forest management plan development and public consultation requirements.

Figure E-1 Requirements for Multiple Submissions of Map 6 – Eligibility Map

Submission Requirement	**Map Submission 1**	**Map Submission 2**	**Map Submission 3**	**Map Submission 4**
Map Product	Eligibility Map - Stage 2 (Map 6)	Eligibility Map - Stage 3 (Map 6)	Eligibility Map - Stage 4 (Map 6)	Eligibility Map - Stage 5 (Map 6)
Public Consultation Stage	Stage Two **First Information Centre**	Stage Three **Second Information Centre**	Stage Four **Draft Plan Submission**	Stage Five **Final/Approved Plan**

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Progression of Forest Management Plan Development

2.1.1 Map Scale Requirements

Each map prescribed in Section 2.1.2 must be prepared according to one of three map scale ranges:

Operational Map Scale Range

Acceptable scales are either 1:10,000; 1:15,840 or 1:20,000. Operational scale maps are also referred to as large scale maps.

Composite Map Scale Range

Acceptable composite scales range from 1:50,000 to 1:250,000. The composite scale chosen must allow for easy, clear interpretation of map themes and ease of reproduction. In most cases the chosen scale will allow for the entire area of the forest management unit to be displayed on a single sheet of paper when printed from a standard plotter.

Summary Map Scale Range

Acceptable summary map scales allow for portrayal of the target area on an 11x 17" or 8.5 x 11" sheet and allow for the appropriate resolution of information and ease of reproduction. Summary Maps are designed and created for public distribution and information.

The operational scale is primarily influenced, and for the most part pre-determined, by the Ontario Basic Mapping program (OBM) tile coverage applicable to the forest management unit. The area of an OBM mapsheet tile has traditionally provided a convenient and appropriate scale for portraying planimetric base features, forest resource inventory (FRI) information, values, and most other resource information that requires a reasonable degree of detail. Aerial photography, which is the basis for most digital FRI available today, also corresponds to the same area coverage and scale as an OBM mapsheet tile. The scale of OBM mapsheet tiles is either 1:10,000 for designated forest management units located in southern and central Ontario, or 1:20,000 for designated forest management units in northern Ontario. Part B, Section 5.0 of the FIM describes the OBM mapsheet tile coverage for Ontario.

The third option for an operational scale; 1:15,840, is primarily based on aerial photography which was used in the production of pre-1987 FRIs. As most designated forest management units now have OBM mapsheet tile coverage and aerial photography based on the same area coverage and scale (1:10,000 or 1:20,000), an operational scale of 1:15,840 is rare.

The map product requirements described in Section 2.1 identify the map scale range as either operational, composite, or summary. Planning teams must determine one scale from each of the operational and composite scale ranges and then apply the chosen map scale for each map required at that type of map scale. For example, if

1:100,000 is the chosen map scale from the composite scale range, then all composite maps must be produced at a scale of 1:100,000. Maps required at a summary scale can be produced at any of the acceptable summary scales.

2.1.1.1 *Parties Required to Prepare and Provide Maps*

The requirements to prepare maps are generally divided between sustainable forest licence (SFL) holders (plan holders) and the MNR and are based on the party responsible (custodian) for maintaining the information. In most cases, the custodian is either the plan author (the SFL holder or plan holder) or the MNR. The planning team may designate specific members of the team to prepare specific maps. These decisions should be identified in the terms of reference for the forest management plan if they differ from the required parties identified in Section 2.1.

2.1.1.2 *Base Feature Information Requirements*

The MNR must ensure that planning teams and the SFL holders (plan holders) are provided with planimetric base feature information for map production purposes. Planimetric base features provide geographic reference features such as transportation routes, lakes, rivers, utility lines, and other features which are included on the forest management planning maps described in this section. The requirements for planimetric base feature information are described in Part B, Section 3.0.

Planning teams also require the planning inventory, which was prepared for the forest management plan, for several mapping requirements. The planning inventory is used as base feature reference information for operational scale maps. The requirements for the planning inventory are described in Part B, Section 5.0.

2.1.2 Requirements for Strategic Planning Maps

The following maps are categorized as strategic planning maps, which provide information relevant to the 20-year period for which a forest management plan is written:

Map 1 – Public Notice Map
Map 2 – Key Map
Map 3 – Management Unit Map
Map 4 – Values Maps
Map 5 – Native Values Map
Map 6 – Eligibility Map

2.1.2.1 *Map 1 – Public Notice Map*

The requirement for a Public Notice Map is described in Part A, Sections 3.3.1 and 3.3.2.1 and Part B, Section 3.4 of the FMPM. The MNR must prepare and provide a Public Notice Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. This map is used with all public notices such as newspaper advertisements, direct mail-out letters, or other forms of publicized information, which have been issued in accordance with the FMPM.

This map presents the general location of the forest management unit boundary and must contain large, well-known, distinctive features such as highways, lakes, rivers, railways and communities as geographic reference features.

The Public Notice Map is a summary map and must be produced at a convenient summary map scale.

2.1.2.2 *Map 2 – Key Map*

The requirement for a Key Map is described in Part A, Sections 2.2.1 and 2.6.4 and Part B, Section 3.2 of the FMPM. This map is used with the forest management plan summary. A French language version of this map must also be produced and be included with the French language version of the plan summary. Sustainable forest licence holders (plan holders) must prepare and provide both the English and French language versions of this map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5.

The Key Map identifies the location of the forest management unit within the MNR administrative region and districts. This map also contains the locations of forest company offices, MNR offices, wood processing sites, and other significant reference features within the area portrayed on the Key Map.

The Key Map is a summary map and must be produced at a convenient summary map scale.

2.1.2.3 *Map 3 – Management Unit Map*

The requirement for a Management Unit Map is described in Part A, Section 3.3.2.2 of the FMPM. The Management Unit Map shows only the area of the forest management unit. This map also displays transportation networks, drainage features, communities, wood processing sites, and other distinctive reference features. Sustainable forest licence holders (plan holders) must prepare and provide a Management Unit Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5.

The Management Unit Map is displayed at Information Centres and identifies the main features of the forest management unit. The Management Unit Map must be produced at the chosen composite map scale for the forest management unit.

2.1.2.4 *Map 4 – Values Maps*

The requirements for Values Maps are described in Part A, Sections 1.4.4, 2.6.2 and 2.6.3 of the FMPM. The requirements for the provision and maintenance of values information are also described in Part B, Section 4.0 of the FIM.

Values Maps are required at both the operational and composite map scales. The operational scale maps (Map 4.0) for the management unit are maintained and used by the planning team for detailed operational planning purposes. Operational scale maps are used for the selection of areas for harvest, renewal, tending, and protection operations, road construction and use, and Area of Concern (AOC) planning purposes. Operational scale Values Maps contain detailed locations of known resource features, land uses, and values which must be considered in forest management planning and about which further information is available. The operational scale maps contain the details for all the values which have been portrayed on all of the composite scale Values Maps.

Composite scale Values Maps contain a summary of the location of known natural resource features, land uses, and values which must be considered in forest management planning and about which further information (including more detailed maps) is available. The composite scale Values Maps may contain groups of similar values.

There are normally six separate Values Maps required at a composite scale:

Map 4.1A Natural Resources Features Values Map – Wildlife, Areas of Natural and Scientific Interest (ANSI) and Forestry Values

This map contains a summary of the locations of wildlife sites and habitat areas, natural heritage areas and various forestry and timber related values.

Map 4.1B Natural Resources Features Values Map – Fisheries And Wetlands

This map contains a summary of the locations of fisheries, wetlands and other sensitive values.

Map 4.2 Resource Uses Values Maps

This map contains a summary of the locations for recreation, commercial tourism, cottage/residential sites or areas, wild rice and peat production areas, cultural heritage sites, other recognized land uses, and infrastructure sites.

Map 4.3 Land Values Map

This map contains a summary of the locations for various land ownership parcels, recognized, licenced, and permitted land uses and tenure.

Map 4.4 Bear Management Areas Values Map

This map contains a summary of the locations for bear management areas.

Map 4.5 Trapline Areas Values Map

This map contains a summary of the locations of recognized trapline areas and trapline features such as cabins.

The features for bear management areas and trapline areas may be combined into one map product. This decision must be made by the planning team and the combined features must be portrayed in a clear and visible manner. If not, these values must be displayed on separate Values Maps.

All values maps, are prepared by the MNR and must be produced at the chosen operational and composite scales for the forest management unit. The MNR must ensure that values maps are prepared and provided to planning teams in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The requirements for values information prescribed in Part B, Section 4.0 also support the update, maintenance and production of Values Maps.

Values maps must also contain other reference features such as transportation routes, lakes, rivers and streams, parks and reserves, the forest management unit boundary, and other distinguishable reference features, as appropriate.

In some cases, if made available, the portrayal of certain values on maps could threaten the existence, integrity, and health of the value. The MNR may make decisions regarding and restricting the portrayal of such values on maps or the availability of further information about values in accordance with Part B, Section 4.1 of the FIM.

2.1.2.5 *Map 5 – Native Values Maps*

The requirements for Native Values maps are described in Part A, Sections 1.4.6 and 2.6.3 of the FMPM.

Native Values Maps are required at both the operational and composite scales. The operational scale maps contain detailed locations of known natural resource features, land uses, and values specifically used by, or of importance to, native communities (e.g., traditional or recreational use areas; trapline areas; reserves and potential reserve areas; sites of archaeological, historical, religious, or cultural significance; and fuelwood areas). The composite scale maps contain a summary of these features.

The MNR determines, through consultation with Native communities, the extent to which Native communities will be involved in the forest management planning process. Based on this consultation, the MNR and Native communities must identify the following:

- the sensitive nature of, and the extent to which Native values and related information will be protected;
- the extent and kind of Native values and related information that can be portrayed on Native Values Maps, and made available for public inspection;
- the extent of the Native values and related information that can be made available to planning team members and/or local citizens' committee (LCC) members; and,
- how this information may be used in the forest management planning process.

The MNR must ensure that all Native Values Maps are prepared at the chosen operational and composite map scales for the forest management unit. These maps must also contain other reference features such as transportation routes, lakes, rivers and streams, parks and reserves, the forest management unit boundary, and other distinguishable reference features, as appropriate.

The MNR may make decisions regarding the portrayal and availability of information regarding Native values and Native interests for the purpose of *Native values maps* and the use of Native values information in forest management planning. These decisions will be in respect of consultations with Native communities in accordance with the *Forest Management Planning Manual*.

2.1.2.6 *Map 6 – Eligibility Maps*

The Eligibility Maps identify areas which are eligible for harvest, renewal, and tending operations during the 20-year period of the forest management plan and also include existing primary roads and alternative primary road corridors. The eligible areas for forest operations must be identified by forest unit. The requirements for these maps are described in Part A, Sections 2.3.7 and 2.3.8 of the FMPM. Sustainable forest licence holders (plan holders) must prepare and provide the eligibility maps in accordance with the timelines described in Section 2.4 and in accordance with the conditions described in Section 2.5. The FMPM also identifies the requirements for the provision of an Eligibility Map(s) at four different stages in the public consultation process:

Stage 2 *Public Consultation Process (FMPM, Part A, Section 3.3.3.2)*

Identifies areas which are eligible for harvest, renewal, and tending operations during the 20-year period, and the *alternative* primary road corridors.

Stage 3	*Public Consultation Process (FMPM, Part A, Section 3.3.4.2)*
	Identifies areas which are eligible for harvest, renewal, and tending operations during the 20-year period, and the *proposed* primary road corridors.
Stage 4	*Public Consultation Process (FMPM, Part A, Section 3.3.5.2)*
	Identifies areas which are eligible for harvest, renewal, and tending operations during the 20-year period, and the *proposed* primary road corridors.
Stage 5	*Public Consultation Process (FMPM, Part A, Section 3.3.6.2)*
	Identifies areas which are eligible for harvest, renewal, and tending operations during the 20-year period, and the *selected* location for each primary road corridor.

The Eligibility Maps are refined at each successive stage in the public consultation process, as described above. If no changes have occurred to the map of eligible areas for operations since the previous public consultation stage, then the same eligibility map can be used at the next stage.

Sustainable forest licence holders (plan holders) may provide the eligible areas for harvest on a separate map from the eligible areas for renewal and tending. This decision must be made by the planning team based on the clarity of information portrayed on the map. If two eligibility maps are produced, the titles of the maps must be identified as the Harvest Eligibility Map and the Renewal and Tending Eligibility Map. In this case, the existing and alternative/proposed/selected primary road corridors must be displayed on the Harvest Eligibility Map.

The Eligibility Maps must also contain other features such as lakes, rivers and streams, exiting transportation routes (roads and railways), parks and reserves and other significant features on the forest management unit. These maps must be produced at the chosen composite map scale for the forest management unit.

2.1.3 Requirements for Operational Planning Maps

The following maps are categorized as operational planning maps, which provide information relevant to the five-year term of a forest management plan:

Map 7	Preferred and Optional Harvest Areas Map
Map 8.0	Areas Selected for Operations Maps
Map 8.1	Areas Selected for Operations Composite Maps
Map 9	FMP Summary Maps

2.1.3.1 *Map 7 – Preferred and Optional Harvest Areas Map*

The requirement for the Preferred and Optional Harvest Areas Map is identified in Part A, Sections 2.4.2.2 and 3.3.3.2 of the FMPM. This map is also referred to as the "Areas Which Meet Harvest Selection Criteria Map" in the FMPM.

This map shows the preferred and optional harvest areas for the five-year term of the forest management plan and a ranking of all areas which meet the harvest selection criteria. Areas identified as *Preferred Rank* contain forest stands whose areas add up to the level of Available Harvest Area (AHA). Areas identified as *Optional Rank* contain alternate forest stands which can be further ranked by preference. This map also shows the alternative primary road corridors for the 20-year period.

Sustainable forest licence holders (plan holders) must prepare and provide the Preferred and Optional Harvest Areas Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Preferred and Optional Harvest Areas Map also contains reference features such as transportation routes (roads, railways), lakes, rivers and streams, parks and reserves, and the forest management unit boundary. These maps must be produced at the chosen composite map scale for the forest management unit.

2.1.3.2 *Map 8.0 – Areas Selected for Operations Maps*

The Areas Selected for Operations Maps provide details of proposed and eventually approved forest operations for harvest renewal, tending, and protection by forest unit and site type combination, primary and secondary road corridors, AOC crossings, fuelwood areas and tree improvement activities. The Areas Selected for Operations Maps are required at three different stages in the public consultation process and are refined at each successive stage.

Planning teams may choose to display the following theme features on separate composite scale maps:

- proposed/approved area for renewal and tending (by forest unit and site type)
- candidate prescribed burn areas
- proposed aerial herbicide areas
- eligible insect pest management areas
- proposed aerial insecticide areas
- fuelwood areas
- tree improvement areas

Stage 3 *Public Consultation Process (FMPM, Part A, Sections 2.4.2.2; 2.4.3.1; 2.4.3.2; 2.4.4.2; 2.4.5.1; 2.4.5.2; 2.4.5.3; 3.3.4.2)*

The Areas Selected for Operations Maps required at Stage 3 contain the following information:

- Proposed operations – harvest, renewal, and tending areas (by forest unit – site type combination)
- proposed primary road corridors
- alternative secondary road corridors
- alternative primary and secondary road AOC crossings, and tertiary road location conditions
- proposed/alternative AOC prescriptions
- candidate prescribed burn areas
- aerial herbicide areas
- aerial insecticide areas
- fuelwood and tree improvement areas

Stage 4 *Public Consultation Process (FMPM, Part A, Section 3.3.5.2)*

The Areas Selected for Operations Maps required at Stage 4 contain the following information:

- Proposed operations – harvest, renewal, and tending areas (by forest unit/site type combination)
- proposed primary road corridors
- *proposed* secondary road corridors
- *proposed* primary and secondary road AOC crossings, and tertiary road location conditions
- *proposed* AOC prescriptions
- candidate prescribed burn areas
- *insect pest management eligibility areas (if applicable)*
- aerial herbicide areas
- aerial insecticide areas
- fuelwood and tree improvement areas

Stage 5 *Public Consultation Process (FMPM, Part A, Section 3.3.6.2)*

The Areas Selected for Operations Maps required at Stage 5 contain the following information:

- MNR-approved operations – harvest, renewal, and tending areas (by forest unit – site type combination)
- *approved* primary road corridors
- *approved* secondary road corridors
- *approved* primary and secondary road AOC crossings, and tertiary road conditions

- *approved* AOC prescriptions
- candidate prescribed burn areas
- aerial pesticide areas
- insect pest management eligibility (if applicable)
- fuelwood and tree improvement areas

Sustainable forest licence holders (plan holders) are required to prepare and provide the Areas Selected for Operations Maps in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. These maps must also include other features such as forest stand boundaries, land base exclusions from the forest management unit, transportation routes (roads and railways), lakes, rivers, streams, creeks and other distinguishable features. These maps must be produced at the operational map scale chosen for the forest management unit.

2.1.3.3 *Map 8.1 – Areas Selected for Harvest Operations Composite Maps*

The Areas Selected for Operations Composite Maps provide the areas selected for main operations, such as planned harvest areas, and primary and secondary road corridors, based on the information that was prepared for Map 8.0 – Areas Selected for Operations Maps. The Areas Selected for Operations Composite Maps are also required at three different stages in the public consultation process and are refined at each successive stage.

Stage 3 *Public Consultation Process*

This map contains *proposed* areas of operations for planned harvest, renewal and tending areas, *proposed* primary road corridors and *alternative* secondary road corridors.

Stage 4 *Public Consultation Process*

This map contains *proposed* areas of operations for harvest, renewal and tending (by forest unit – site type combination), *proposed* primary road corridors and *proposed* secondary road corridors.

Stage 5 *Public Consultation Process*

This map contains MNR *approved* areas of operations – harvest, renewal and tending (by forest unit – site type combination), *approved* primary road corridors and approved secondary road corridors.

Sustainable forest licence holders (plan holders) are required to prepare and produce the Areas Selected for Operations Composite Maps in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. These maps must also include other significant features such as transportation routes (roads and railways), lakes, rivers, streams, creeks, townships, and other distinguishable features. These maps must be produced at the composite map scale chosen for the forest management unit.

2.1.3.4 *Map 9 – FMP Summary Map*

The FMP Summary Maps are created primarily for public distribution and contain summary information which identifies past harvest areas and information contained in Map 6, Map 7, Map 8, and Map 18. The FMP Summary Maps require a minimum set of four maps that are required at various stages in the public consultation process to describe the past, present, and future areas of operations on the forest management unit:

Stage 2 *Public Consultation Process (FMPM, Part A, Sections 2.4.2.2; 3.3.3.2)*

This map portrays the preferred and optional harvest areas (ranked) for the five-year term of the new plan, alternative primary road corridors for the 20-year period of the plan, and the past and approved areas of harvest from the previous two plan terms (ten years) and the current plan. The information portrayed on this map contains information from Map 6, Map 7, and Map 18.

Stage 3 *Public Consultation Process (FMPM, PART A, Sections 2.6.3; 3.3.4.2)*

This map portrays the proposed areas for harvest, renewal, and tending for the five-year term of the new plan, proposed primary road corridors, alternative secondary road corridors, and the past and approved areas of harvest from the previous two plan terms (ten years) and the current plan. The information portrayed on this map contains information from Map 8.0 (Stage 3) and Map 18.

Stage 4 *Public Consultation Process (FMPM, Part A, Sections 2.6.3; 2.6.4; 3.3.5.2)*

This map portrays the proposed areas for harvest, renewal, and tending for the five-year term of the new plan, and the proposed primary and secondary road corridors. The information portrayed on this map contains information from Map 8.0 (Stage 4). A French language version of this map must also be prepared.

Stage 5 *Public Consultation Process (FMPM, Part A, Sections 2.6.4; 3.3.6.2)*

This map portrays the approved areas for harvest, renewal, and tending for the five-year term of the new plan, and the approved primary and secondary road corridors. The information portrayed on this map contains information from Map 8.0 (Stage 5). A French language version of this map must also be prepared and is required as part of the French language version of the Forest Management Plan Summary.

Sustainable forest licence holders (plan holders) are required to prepare and provide the FMP Summary Maps in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The FMP Summary Maps must also include other features such as transportation routes (roads and railways), lakes, rivers, and other distinguishable features. The planning team may choose to display some themes on separate maps to improve their readability. All of the FMP Summary Maps must be produced at a convenient and reproducible summary map scale.

2.1.4 Requirements for Annual Operations Maps

The following maps are categorized as annual planning maps which provide information relevant to the annual work schedule (AWS – one year of operations), which must be consistent with an approved forest management plan:

Map 10	Annual Work Schedule Operations Map
Map 11	Annual Work Schedule Composite Operations Maps
Map 12	Annual Work Schedule Summary Map
Map 13	Prescribed Burn Operations Map
Map 14.1	Areas Eligible for Insect Pest Management
Map 14.2	Insect Infestations Map
Map 15.1	Aerial Herbicide Project Maps
Map 15.2	Aerial Insecticide Project Maps

2.1.4.1 *Map 10 – Annual Work Schedule Operations Map*

The requirements for an Annual Work Schedule Operations Map are described in Part B, Sections 3.2 and 3.4 of the FMPM. This map identifies details for areas of scheduled forest operations for one fiscal year and includes:

- Harvest/reserve, renewal, tending, and protection operations
- AOCs
- fuelwood areas
- type and location of tree improvement activities
- 500 metre and 100 metre corridors within AOCs for primary and secondary roads
- areas where tertiary roads are not permitted, or where there are specific conditions on tertiary roads

Sustainable forest licence holders (plan holders) must prepare and provide the Annual Work Schedule Operations Maps in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. This map must also include other features such as forest stand boundaries, land base exclusions from the forest management unit, transportation routes (roads; primary, secondary, and tertiary forest access roads; trails, railways), lakes, rivers, streams, creeks, and other distinguishable reference features. The Annual Work Schedule Operations Map must be produced at the operational map scale chosen for the management unit.

2.1.4.2 *Map 11 – Annual Work Schedule Composite Map*

The requirements for the Annual Work Schedule Composite Map are described in Part B, Section 3.2 of the FMPM. This map identifies the locations of operations which are scheduled to be carried out during the fiscal year of the AWS and includes harvest, renewal, tending, and protection areas; fuelwood areas; tree improvement areas; and 500 m and 100 m corridors within AOCs for primary and secondary roads. The information contained on this map is produced from Map 10.

Sustainable forest licence holders (plan holders) must prepare and provide the Annual Work Schedule Composite Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Annual Work Schedule Composite Map must also include other features such as transportation routes (roads, railways), lakes, rivers, streams and other distinguishable reference features. The Annual Work Schedule Composite Map must be produced at the composite map scale chosen for the management unit.

2.1.4.3 *Map 12 – Annual Work Schedule Summary Map*

The requirements for the Annual Work Schedule Summary Map are described in Part B, Sections 3.2 and 3.4 of the FMPM. This map identifies a summary of the locations of operations which are scheduled to be carried out during the fiscal year of the AWS and includes harvest, renewal, tending, and protection areas; fuelwood areas; tree improvement areas; and new primary and secondary road construction. The information contained on this map is produced from Map 11 and is created for public distribution purposes.

Sustainable forest licence holders (plan holders) must prepare and provide the Annual Work Schedule Summary Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Annual Work Schedule Summary Map must also include other features such as transportation routes (major roads, railways), lakes, rivers, communities and other major reference features. The Annual Work Schedule Summary Map must be produced at a convenient summary map scale.

2.1.4.4 *Map 13 – Prescribed Burn Operations Map*

The requirements for the Prescribed Burn Operations Map are described in Part B, Section 4.0 of the FMPM and in the *Prescribed Burn Planning Manual*. For each prescribed burn, an operational plan must be prepared. The approved prescribed burn plan and maps are appended to the AWS. The detailed mapping requirements for the prescribed burn operational plan are outlined in the *Forest Operations and Silviculture Manual* and in the *Prescribed Burn Planning Manual*.

Sustainable forest licence holders (plan holders) must prepare and provide the Prescribed Burn Operations Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Prescribed Burn Operations Map must also include other features such as forest stand boundaries, transportation routes (roads, railways), lakes, rivers, streams and other reference features as described in the *Prescribed Burn Planning Manual*. The Prescribed Burn Operations Map must be produced at a scale prescribed by the *Prescribed Burn Planning Manual*.

2.1.4.5 *Map 14.1 – Areas Eligible for Insect Pest Management Map*

The requirements for the Areas Eligible for Insect Pest Management Maps are described in Part B, Section 6.0 of the FMPM. This map identifies areas which are eligible for insect pest management. It is also used to assist the public in reviewing the proposed insect pest management program and specific proposals for insect pest management projects, before decisions are made.

The MNR must prepare and provide the Areas Eligible for Insect Pest Management Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Areas Eligible for Insect Pest Management Map must also include other features such as transportation routes (roads, railways), lakes, rivers, streams, parks and reserves, and other distinguishable reference features. The Areas Eligible for Insect Pest Management Map must be produced at the composite map scale chosen for the forest management unit.

2.1.4.6 *Map 14.2 – Insect Infestations Map*

The requirements for the Insect Infestations Maps are described in Part B, Section 6.0 of the FMPM. This map identifies areas of insect infestations and provides forecasts of potential areas of infestations based on projections in insect population changes. It is also used to assist the public in reviewing the proposed insect pest management program and specific proposals for insect pest management projects, before decisions are made.

The MNR must prepare and provide the Insect Infestations Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5.

The Insect Infestations Map must also include other features such as transportation routes (roads, railways), lakes, rivers, streams, parks and reserves, and other distinguishable reference features. The Insect Infestations Map must be produced at the composite map scale chosen for the forest management unit.

2.1.4.7 *Map 15.1 – Aerial Herbicide Project Map*

The requirements for the Aerial Herbicide Project Maps are described in Part B, Section 5.0 of the FMPM and in the Aerial Spraying for Forest Management Manual. For each aerial herbicide project, an operational plan must be prepared. The approved aerial herbicide project plan and maps are appended to the AWS. The Aerial Herbicide Project Maps must identify the treatment areas and buffer zones associated with each aerial herbicide project. The detailed mapping requirements for the herbicide project plan are outlined in the *Forest Operations and Silviculture Manual* and in the *Aerial Spraying for Forest Management Manual.*

Sustainable forest licence holders (plan holders) must prepare and provide Aerial Herbicide Project Maps in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Aerial Herbicide Project Maps must also include other features such as forest stand boundaries, transportation routes (roads, railways), lakes, rivers, streams and other reference features as described in the *Aerial Spraying for Forest Management Manual.* The Aerial Herbicide Project Maps must be produced at a scale prescribed by the *Aerial Spraying for Forest Management Manual.*

2.1.4.8 *Map 15.2 – Aerial Insecticide Project Maps*

The requirements for the Aerial Insecticide Project Maps are described in Part B, Section 5.0 of the FMPM and in the *Aerial Spraying for Forest Management Manual.* For each aerial insecticide project, an operational plan must be prepared. The approved insecticide project plan and maps are appended to the AWS. The Aerial Insecticide Project Maps must identify the treatment areas and buffer zones associated with each aerial insecticide project. The detailed mapping requirements for the insecticide project plan are outlined in the *Forest Operations and Silviculture Manual* and in the *Aerial Spraying for Forest Management Manual.*

The Aerial Insecticide Project Maps must also include other features such as forest stand boundaries, transportation routes (roads, railways), lakes, rivers, streams and other reference features as described in the *Aerial Spraying for Forest Management Manual.* The Aerial Insecticide Project Map must be produced at a scale prescribed by the *Aerial Spraying for Forest Management Manual.*

2.1.5 Requirements for Report Maps

The following maps are categorized as annual report maps and RPFO maps which provide information based on actual forest management activities and natural changes which have occurred on the forest management unit:

Map 16	Annual Report Depletion Maps
Map 17	Annual Report Renewal, Tending and Protection Maps
Map 18	Report of Past Forest Operations Depletion Summary Map
Map 19	Report of Past Forest Operations Renewal, Tending and Protection Summary Map
Map 20	Report of Past Forest Operations Access Roads Summary Map

2.1.5.1 *Map 16 – Annual Report Depletion Maps*

The requirements for the Annual Report Depletion Maps are described in Part C, Section 3.2 of the FMPM. Part D, Section 3.0 of the FIM describes the requirement for SFL holders (plan holders) to provide digital annual report information in geographic spatial coverages and reproducible digital map products. The content of the reproducible digital map products must contain the information described by the annual report depletion maps. The requirements for the reproducible digital map products described in Part D, Section 3.0 replace the former hardcopy map requirements for annual depletion information. Sustainable forest licence holders (plan holders) are no longer required to provide hardcopies of the Annual Report Depletion Maps.

Sustainable forest licence holders (plan holders) must prepare and provide Annual Report Depletion Maps as reproducible digital map products (see Part D, Section 3.0) in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The reproducible digital map products should be based on the production of a composite map scale chosen for the forest management unit.

2.1.5.2 *Map 17 – Annual Report Renewal, Tending and Protection Maps*

The requirements for the Annual Report Renewal, Tending and Protection Maps are described in Part C, Section 3.2 of the FMPM. Part D, Section 3.0 of the FIM describes the requirement for SFL holders (plan holders) to provide digital annual report information in geographic spatial coverages and reproducible digital map products. The content of the reproducible digital map products must contain the information described by the annual report renewal, tending and protection maps. The requirements for the reproducible digital map products described in Part D, Section 3.0 replace the former requirements for hardcopy maps of the annual renewal, tending, and protection activities. Sustainable forest licence holders (plan holders) are no longer required to provide hardcopies of the Annual Report Renewal, Tending and Protection Maps.

Sustainable forest licence holders (plan holders) must prepare and provide Annual Report Renewal, Tending and Protection Maps as reproducible digital map products (see Part D, Section 3.0) in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The reproducible digital map products should be based on the production of a composite map scale chosen for the forest management unit.

2.1.5.3 *Map 18 – Report of Past Forest Operations Depletion Summary Map*

The requirements for the Report of Past Forest Operations Depletion Summary Map are described in Part C, Section 4.2 of the FMPM. The Report of Past Forest Operations Depletion Summary Map must be submitted with the RPFO. This map identifies depleted areas and corresponds with the information contained in Table RPFO-1. This map summarizes the depleted areas for the plan term associated with the RPFO, plus the depleted areas for the plan term preceding the RPFO, and also includes a summary of the approved harvest areas for the current plan term. This map is created by combining the information contained in the Annual Report Depletion Base Coverages as described in Part D, Section 3.0 for each of the years in the previous plan term.

Sustainable forest licence holders (plan holders) must prepare and provide the Report of Past Forest Operations Depletion Summary Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Report of Past Forest Operations Depletion Summary Map must also include other features such as transportation routes (roads, railways), lakes, rivers, streams, and other distinguishable reference features. The Report of Past Forest Operations Depletion Summary Map must be produced at the chosen summary map scale for the forest management unit.

2.1.5.4 *Map 19 – Report of Past Forest Operations Renewal, Tending and Protection Summary Map*

The requirements for the Report of Past Forest Operations Renewal, Tending and Protection Summary Map are described in Part C, Section 4.2 of the FMPM. This map must be submitted with the RPFO and identifies areas that were renewed, treated and protected for the plan term associated with the RPFO. This map is created by combining the information contained in the Annual Report Silvicultural Treatment Base Coverages as described in Part D, Section 3.0 for each of the years in the previous plan term.

Sustainable forest licence holders (plan holders) must prepare and provide the Report of Past Forest Operations Renewal, Tending and Protection Summary Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Report of Past Forest Operations Renewal, Tending and Protection Summary Map must also include other features such as transportation routes (roads, railways), lakes, rivers, streams and other distinguishable reference features. The Report of Past Forest Operations Renewal, Tending and Protection Summary Map must be produced at the chosen summary map scale for the forest management unit.

2.1.5.5 *Map 20 – Report of Past Forest Operations Access Roads Summary Map*

The requirements for the Report of Past Forest Operations Access Roads Summary Map are described in Part C, Section 4.2 of the FMPM. The Report of Past Forest Operations Access Roads Summary Map must be submitted with the RPFO. This map identifies the locations of primary and secondary access roads which were constructed during the plan term associated with RPFO. This map is created by combining the information prepared from the former requirements for Map 16 (Annual Report Depletions Maps) described in Section 2.1.5.1 and/or the Annual Report Road Construction/Use Base Coverage described in Part D, Section 3.0 for each of the years in the previous plan term.

Sustainable forest licence holders (plan holders) must prepare and provide the Report of Past Forest Operations Access Roads Summary Map in accordance with the timelines described in Section 2.4 and the conditions described in Section 2.5. The Report of Past Forest Operations Access Roads Summary Map must also include other features such as transportation routes (roads, railways), lakes, rivers, streams, and other distinguishable reference features. The Report of Past Forest Operations

Access Roads Summary Map must be produced at the chosen summary map scale for the forest management unit.

2.1.6 Other Maps Used for Forest Management Planning Purposes

Part E of the FIM may not describe all of the maps which may be used during the preparation or implementation of forest management plans. Planning teams and/or SFL holders (plan holders) may create and utilize other map products for the purpose of preparing a forest management plan. Planning teams must approve the use of other maps which are used for forest management planning purposes. The MNR may require hardcopies of these other map products and related information. The applicable MNR district, in consultation SFL holders (plan holders), will determine the timelines for provision of other maps products and information used in forest management planning.

2.2 Standards for Forest Management Planning Maps

The following standards identify the mandatory information and map surround components that must be used in the preparation of each map prescribed by Section 2.1:

- **map name** – the number and title of the map
- **purpose/general content** – the reason the map is being produced and its general content. The map purpose is usually derived from the FMPM.
- **comments** – information about the map that does not fit into any of the other headings, such as confidentiality
- **FMPM reference** – the section of the FMPM that identifies the requirement for the map
- **prime audience** – describes in general terms, the target audience for the particular map product
- **scale** – the scale at which the map is produced
- **extent** – area coverage required of the map
- **when required** – indicates the earliest stage in the public consultation process for the forest management planning process that the map is required to be available. (Note that a map created for stage 2 may also be required at later stages.)
- **responsibility** – indicates who is responsible for the production and availability of the map
- **map surround components** – indicates which components of the map surround are required (see Section 2.2.1)
- **information displayed** – lists specifically the standard minimum information that must appear on the map. Requirements are organized into theme and base features.

2.2.1 Standards for Map Surround Components

All maps will have a similar map surround. Maps produced for the forest management planning purposes, but which are not displayed at Information Centres, are still considered available for public viewing and external distribution and therefore must conform to the map surround standards described in this section. The map surround is modeled on the *Map Surround Standards for GIS Generated Map Products Produced For External Distribution*. This document was produced by the MNR and applies to all map products produced since January, 1994. Where particular features of these map surround standards do not apply to a map, it will be noted in the detailed map descriptions which are described in the *Mapping Requirements and Standards Manual for Forest Management Planning Technical Specifications*. Map surround components are as follows:

- **logo** – Ontario Government logo or forest company logo (or combination) as appropriate
- **title block** – includes the management unit name, the term of the forest management plan, and the number and name of the map. The number and name of the map is indicated in the detailed map descriptions.
- **index map** – indicates the extent of the area shown on the map in relation to a larger area. Composite maps will show their extent in relation to the rest of Ontario. Operational scale maps (1:20,000; 1:10,000; 1:15,840) will show their extent in relation to the management unit.

- **legend** – provides a list of map symbols used for theme and base features.
- **disclaimer** – required to safeguard against any possible liability on the part of the MNR or the forest products companies. A disclaimer is of particular importance with the take-home maps.
- **scale bar/statement** – provides the relationship between map distance and true (ground) distance
- **map publication date** – indicates the version or current edition of the map. Usually this date is generated by the computer.
- **copyright** – indicates who maintains ownership of the data/information (see Section 2.3)
- **notes** – includes general information not provided elsewhere, such as datum or contact names
- **north arrow** – grid north direction indicator (not required if map is oriented with north to the top of page)
- **border** – map frame

Further standards regarding the mandatory information required for each map and the map surround standards are described in the *Mapping Requirements and Standards for Forest Management Planning Technical Specifications* as prescribed by the conditions in Section 2.5.

2.2.2 Standards for Values Maps Symbology

Part A, Section 2.2.6 of the FMPM references the requirement for standardizing the symbols which appear on values maps. The MNR must ensure that values maps are provided to planning teams in accordance with the requirements described in Section 2.1.2.4. The standards for symbols used on values maps are described in the *Mapping Requirements and Standards for Forest Management Planning Technical Specifications*, as prescribed by the conditions in Section 2.5. The MNR and SFL holders (plan holders) must apply the Values symbology prescribed in Section 2.5 for all values maps, or maps which portray values information, which are used for the purpose of forest management planning.

The FIM does not prescribe standards for the symbology on other maps used for forest management planning purposes. Consequently, planning teams must determine the map symbols which will be applied on all other maps used for these purposes. Map symbology will be selected based on the clear portrayal of map features with some consideration for reproducibility.

2.3 Roles and Responsibilities for Forest Management Planning Maps

All parties participating in forest management planning must be provided access to maps prepared for this purpose, as identified in Section 2.0. The maps described in

Section 2.1 will be on display at one or more Information Centres, which are required for public consultation purposes. Maps which have been on display at one Information Centre will be available for review at all subsequent Information Centres.

Public access to the maps prescribed by the FIM will occur primarily through the Information Centres and the public consultation opportunities described in the FMPM. However, participants in the forest management planning process can request access at times other than the formal Information Centres. Planning teams will ensure that participants in the forest management planning process have access to the maps described in Part E.

The copyright for all maps which must be provided by SFL holders (plan holders) for the purpose of forest management, in accordance with the requirements described in Section 2.1, is shared between the MNR (Crown) and the SFL holders (plan holders). Shared copyright as described in Part A, Section 1.2 places no restrictions on use of this information by either party.

Other maps, such as Values maps, which must be prepared and provided by the MNR in accordance with the requirements described in Section 2.1, are copyrighted and owned exclusively by the Crown, as administered by the Queen's Printer for Ontario.

Summary Maps will be made available for public consumption at each Information Centre and plan review and inspection opportunities. Copies of summary maps may also be obtained without charge from the appropriate MNR area or district office. Copies of other maps may be provided to participants upon request. The MNR may establish fees for the provision of other maps prescribed by the requirements in Section 2.1 which are not identified as Summary Maps. The MNR may also make restrictions on the use of other maps and related information if the maps and related information are not used for forest management planning purposes.

2.3.1 Sensitive and Confidential Map Information

In most cases, the maps and related information prescribed by the requirements in Section 2.1 are part of the open public consultation process for forest management planning on Crown lands. However, some maps and related information may contain sensitive or confidential information that, if made available, could threaten the existence, integrity, or health of natural resources or uses (values), or may expose confidential or personal information.

The MNR may make decisions regarding the restriction of access to sensitive or confidential information which may be portrayed on maps or related to further information used to support features shown on maps with due consideration of the following:

- agreements established with other agencies such as the Ministry of Tourism, Culture and Recreation; Aboriginal First Nations and Native communities; Natural Heritage Information Centre; and other similar stakeholders which may be impacted by the use or availability of sensitive information;
- the Freedom of Information and Protection of Privacy Act (FIPPA);
- the protection of natural resources and values; and
- recognition and protection of vulnerable, threatened, or endangered species and their habitats.

In cases where the MNR restricts or prohibits access to, or provision of, sensitive or confidential information related to maps, they will ensure that these values or interests are considered in forest management planning and will provide planning teams with direction regarding the protection of such values and interests.

2.3.2 Checking for Completeness and Verification of Accuracy

Both the MNR and SFL holders (plan holders) must ensure that all maps which are produced for the purpose of forest management planning are checked for completeness and verified for accuracy in accordance with the requirements, standards and conditions described in Section 2.0.

The MNR may make recommendations to SFL holders (plan holders) regarding the portrayal of features and presentation of maps which are submitted at more than one stage in the forest management planning process.

2.4 Timelines for Forest Management Planning Maps

The timelines for provision of strategic and operational planning maps are directly related to the maps and information which must be available for each stage in the public consultation process described in Part A, Section 3.0 of the FMPM. The annual planning maps are required with submission of the AWS. The report maps are required annually with submission of the annual report or once every five years with the submission of the RPFO. Table E-1 identifies each stage of the forest management planning process for which strategic and operational planning maps prescribed by the requirements in Section 2.1 must be provided.

These timelines are consistent with the public consultation requirements; strategic, operational, and annual planning requirements; and the reporting requirements described in the FMPM. All maps and materials from one stage in the public consultation process should be available at all subsequent stages.

The RPFO Maps have been included in Table E-1 for reference only, as these maps are required as background information at Stage 1 in the forest management planning process. The timeline for provision of the Report of Past Forest Operations Maps is described in Section 2.4.3.

Table E-1 Timelines for Strategic and Operational Planning Maps

Stage One **Invitation to Participate**	Map 1	Public Notice
	Map 3	Management Unit
	Map 4	Values
	Map 18	RPFO Depletion Summary
	Map 19	RPFO Renewal, Tending, and Protection Summary
	Map 20	RPFO Access Roads Summary
Stage Two **First Information Centre**	Map 5	Native Values
	Map 6	Eligibility - Stage 2
	Map 7	Preferred and Optional Harvest Areas
	Map 9	FMP Summary - Stage 2
Stage Three **Second Information Centre**	Map 6	Eligibility Stage 3
	Map 8.0	Areas Selected For Operations - Stage 3
	Map 8.1	Areas Selected For Operations Composite - Stage 3
	Map 9	FMP Summary - Stage 3
Stage Four **Draft Plan**	Map 2	Key
	Map 6	Eligibility - Stage 4
	Map 8.0	Areas Selected For Operations - Stage 4
	Map 8.1	Areas Selected For Operations Composite - Stage 4
	Map 9	FMP Summary - Stage 4
	Map 14.1	Areas Eligible for Insect Pest Management*
	Map 14.2	Insect Infestations*
Stage Five **Approved Plan**	Map 6	Eligibility - Stage 5
	Map 8	Areas Selected For Operations - Stage 5
	Map 8.1	Areas Selected For Operations Composite - Stage 5
	Map 9	FMP Summary - Stage 5

* If Applicable

2.4.1 Timelines for Annual Operations Maps

The following AWS maps are required with submission of the AWS to the MNR district office three months prior to the commencement of operations, which normally begin on April 1:

Map 10	Annual Work Schedule Operations Map
Map 11	Annual Work Schedule Composite Operations Map

Map 12	Annual Work Schedule Summary Map
Map 13	Prescribed Burn Operations Map
Map 14.1	Areas Eligible for Insect Pest Management Map
Map 14.2	Insect Infestations Map
Map 15.1	Aerial Herbicide Project Maps
Map 15.2	Aerial Insecticide Project Maps

2.4.2 Timelines for Annual Report Maps

The following annual report maps must be provided as digital map products as described in Part D, Section 3.0 and must be provided with Part One or Part Two of the annual report submission:

Map 16	Annual Report Depletion Maps
Map 17	Annual Report Renewal, Tending and Protection Maps

2.4.3 Timelines for Report of Past Forest Operations Maps

The following RPFO maps must be provided with the RPFO submission, which is required within two years of the expiry date of the past forest management plan as described in Part C, Section 4.0 of the FMPM:

Map 18	Report of Past Forest Operations Depletion Summary Map
Map 19	Report of Past Forest Operations Renewal, Tending and Protection Summary Map
Map 20	Report of Past Forest Operations Access Roads Summary Map

The timelines for the provision of RPFO maps, are in addition to the timelines described in Table E-1.

2.4.4 Timelines for Other Required Maps Used for Forest Management Planning Purposes

The MNR and SFL holders (plan holders) will jointly determine the timelines for the provision of other maps used for forest management planning purposes, as described by the requirements in Section 2.1.6.

2.5 Conditions for Forest Management Planning Maps

Sustainable forest licence holders (plan holders) and the MNR must prepare and provide the maps described by the requirements in Section 2.1 and the standards described in Section 2.2, in accordance with the *Mapping Requirements and Standards for Forest Management Planning Technical Specifications.* All maps prescribed in Part E must be created and provided as hardcopies (paper copies) with the exception of Annual Report Maps 16 and 17 which are described in Sections 2.1.5.1 and 2.1.5.2 respectively.

The *Mapping Requirements and Standards for Forest Management Planning Technical Specifications* also prescribe the Mapping symbology (map symbols) which must be applied to all values maps in accordance with the standards prescribed in Section 2.2. The MNR will provide SFL holders (plan holders) with the standard set of values symbols. Sustainable forest licence holders (plan holders) must apply the standard values symbology for all maps which portray values features and which are used for the purpose of forest management planning.

GLOSSARY OF TERMS

Accuracy (A characteristic of Data Quality) The extent to which a measurement approaches the true value of the measured quantity. Accuracy requires precision.

Additional Information Additional information is information that has more information than specific information, which has been described by scope or extent, contents, data (attributes), format or use. In reference to FIM, additional information exceeds the information requirements prescribed in the FIM.

Arc An ordered string of vertices (x, y coordinate pairs) that begin at one location and end at another. Connecting an arc's vertices forms a line. The vertices at each end point of a line are called nodes.

Archive A filing system for information designed to be kept for a long time. A file containing compressed contents of other files from which the original files can be reconstructed from the compressed contents of the archived file.

Attribute (Data Attribute) A piece of information that describes a data entity. It is a logical representation of the data item in question. A characteristic of a geographic feature, described by numbers, characters, images which are typically stored in a tabular format (rows and columns in a database table).

Auditability (A characteristic of Data Quality) Auditability refers to the ability to track, through documentation, the history of data.

Basemap A map containing geographic features which are used as a locational reference. A map which displays basic planimetric information (drainage and cultural features) and which is used as a base for forest coverage. Compiled from existing topographical or planimetric maps or from aerial photographs. The term basemap is often associated with the Ontario Basic Mapping program (OBM) where fixed geographic areas for each basemap or mapsheet tile are determined from the UTM map project system.

Buffer A zone of a specified distance which is created (buffering) around a coverage feature (point, line, polygon). Buffer zones form polygon areas that are either inside or outside the specified buffer distance from the coverage feature.

Cadastral (Cadastre) Refers to a system used to store and maintain the cadastre. The cadastre consists of three parts: continuous areas of land within which unique and homogeneous interests are recognized (cadastral parcels), the graphic and text information describing the nature and extent of the interests (cadastral records), and a system for relating parcels and records (parcel index).

Centroid (Polygon Centroid) In terms of polygons and geographic information systems, the centroid is the geographic centre or the average of the "x" and "y" values making up the perimeter points. Used to locate a polygon and its label (referred to as a polygon centroid).

Code A string of alphanumeric characters used as a proxy for a name, condition, property, etc. The choice of particular characters (or digits) and their sequential order may denote membership in aggregates or collectives.

Collection (in reference to Stewardship Inventory and Planning Inventory) A collection refers to a group of individual coverages or layers that contain geographic information related to several themes.

Completeness (see Relevance and Timeliness)

Coordinate System A reference system used to measure horizontal and vertical distances on a planimetric map. A coordinate system is usually defined by a map projection, a spheroid of reference, a datum, one or more standard parallels, a central meridian and possible shifts in the x and y directions to locate *x, y* positions of point, line and area (polygon) features. A common coordinate system is used to spatially reference geographic data for the same area.

Copyright Copyright is the right to produce, reproduce, perform or publish a literary or artistic work, including software, data and information in various forms.

Copyright Licence

Single End-User: Permits clients to purchase, use and modify MNR intellectual property on a one-time basis. This type of licence prohibits clients from copying, sharing or distributing the intellectual property without obtaining prior permission from MNR.

Multi End-User: Permits clients to purchase, use and modify MNR intellectual property in many locations simultaneously. This licence prohibits clients from further distribution to third parties.

Resale: Permits clients to purchase, use, modify and resell MNR intellectual property to third parties.

Coverage A digital version of a map. A set of thematically associated data considered as a unit. A coverage usually represents a single theme, or layer, such as soils, water, roads, ownership, etc.

Currency (A characteristic of Data Quality) Currency refers to the validity of the data for current situations. It also refers to the age of the data.

Data (synonymous with: Raw Data) Data are known facts about a subject used as a basis for inference. Observations or measurements of the attributes (characteristics) of entities such as people, places, things or events that, individually, have relatively little intelligence. Basic data which are collected and do not require processing to create. Data is the smallest unit of information usually expressed by one or more data attributes.

Data Acquisition The act of obtaining data, which includes data collection and data gathering and the sampling methods employed.

Data Attribute (see Attribute)

Database A collection of inter-related data organized according to a scheme.

Data Dissemination Access to and distribution of data.

Data Element A unit of data, that in a certain context, is considered indivisible. Physical representation of a data attribute. Also known as a data field or a data item.

Data Entity The logical representation of some "thing" that is to be stored (on computer tape or disk, or paper) for future reference.

Data Field A logical element of data within a record or a collection of subfields. A field may be a number, or numbers or a collection of characters. Field sizes and data types are dependent on the format of the record.

Data Processing The systematic performance of operations on data.

Data Quality A description of the ability of the data to perform as intended; includes the components of accuracy, auditability (verifiability), completeness, currency, precision, relevance, reliability, repeatability, reproducibility, resolution, and timeliness.

Data Standard Direction which provides a measure of quality in processes or products related to the reliability, usability and expected performance of data. A standard for data is an objective to be met for the purpose of achieving a specific minimum level of performance or quality in a process or product.

Datum A set of parameters and control points used to accurately define the three-dimensional shape of the earth. The datum provides the basis for a planar coordinate system.

Decision-Support System An information system that utilizes decision modules, a database and a decision-maker's own insight in an ad-hoc, interactive analytical modelling process to reach a specific decision by a specific decision-maker.

***De Facto* Standard** A standard that has developed or been adopted through common use.

Derived Data Data that are created from two or more items of raw data.

Descriptive Data Tabular data describing the characteristics of geographic features, also referred to as attribute data.

Different Information Different information is information that varies from specific information which has been described by scope or extent, contents, data (attributes), format or use. In reference to FIM, different information is information that varies from the information required in the information products as described in the FIM, but is intended to meet the prescribed information requirements.

Digital Information Any information which is stored in an electronic form (usally as organizations of electrical signals represented by 1's and 0's (binary numbers).

Digitize To convert input into a form that can be used by a computer. The process of transforming information on a map (boundaries of a feature) into digital information stored as set of directional and relational coordinates.

Double-Precision (see also Single-Precision) Refers to the level of accuracy (i.e., accuracy of coordinates) for a numeric value based on the number of significant digits that can be stored for the value. A way of representing floating-point numbers with twice the usual number of significant digits. Computation or rounding of numbers is slower using double-precision. than single-precision. Double-precision numbers store up to 15 significant digits.

Ecosite An ecological landscape classification unit (ranging in resolution from several hectares to thousands of hectares) comprised of relatively uniform geology, parent materials, soils, topography, and hydrology, occupied by a consistent complex of successionally related vegetation conditions (FMPM)

Edge-matching An editing procedure applied to ensure that all features that cross adjacent mapsheet (tiles) have the same edge locations.

Electronic Data Interchange (EDI) The transfer of electronic information between organizations in machine-readable (computer recognizable) form based on a set of standards and protocols.

Electronic Information The raw elements of information which are organized into a series of electrical pulses stored in as binary values of 0's and 1s. Electronic information also infers the type of medium that information is transferred by means of electrical signals, such as a television or computer. Opposite of hardcopy information.

Expert System A computer application that uses a knowledge base of human expertise for problem solving.

First Date of Effect The first time that a provision within the Forest Information manual takes effect. A term used to identify when information that meets a specific requirement, standard and/or a certain format(s) must be first provided, or when roles and responsibilities or conditions related to information, first apply. First Dates of Effect are identified as part of the timelines for information and information products prescribed in the FIM.

Forest Stand A community of trees possessing sufficient uniformity in composition, age, arrangement, or condition to be distinguishable from the forest or other growth on adjoining areas, thus forming a silvicultural or management entity.

Free-To-Grow Stands that meet stocking, height and/or height growth rate, as specified in the ground rules and are judged to be essentially free from competing vegetation (FMPM).

Geodetic Datum Refers to a standard mathematical process or mathematical representation of size and shape of the earth and the determination of exact positions and points on its surface.

Geographic (Data) Information The locations and descriptions of geographic features. The composite of spatial data and descriptive data, as contained in a geographic database.

Geographic Information System (GIS) An information system that uses a spatial database to provide answers to queries of a geographical nature through a variety of manipulation, such as sorting, selective retrieval, calculation, spatial analysis, and modelling.

Geographically Referenced Refers to the condition of data for which "positional" information is available, enabling the geographical position of the data to be established and communicated. The normal functioning of a geographic information system requires the existence of geographically referenced data in a spatial data base and a means of manipulating these data. Geographically referenced data is also referred to as geo-referenced data.

Geo-referenced (see Geographically Referenced)

Hardcopy Information Information that is presented or portayed on other than electronic media such as paper, plaques, books, maps, photographs, etc. Opposite of electronic information.

Information Information comes from data that have been processed (synthesized, organized, selected, sorted, etc.) to provide products which can be used in decision making. Information includes numerical data, text, drawings, designs, maps, photographs, video and audio recordings, or ideas.

Information Management The application of a set of management disciplines for the purposes of managing all of the data and information and related technological, physical and human resources relevant to the business of the organization.

Information Products The result of processing data to become information. The representation (summarization, illustration, etc.) of information in an electronic or hardcopy format such as: maps, reports, tables, graphs, photographs, etc.

Information System A system (manual or automated or computerized) which enables the processing and dissemination of information.

Intellectual Property Intellectual property is data and information and the rights that protect it. Examples of intellectual property are government trade marks such as the stylized trillium symbol and the government publications, data bases, research findings, photographs, etc., which are protected by copyright (Queen's Printer in Ontario).

Intellectual Property Rights Intellectual property rights include copyright, patent, trademark and other forms of intellectual property protection.

Inventory Base Feature Refers to a specific set of planimetric base features such as water, transportation, ownership that are incorporated into a coverage containing forest resources inventory information as the main theme.

Knowledge Structured information that has been linked, evaluated and insightfully compacted.

Knowledge-Based System An intelligent information system (i.e., an expert system) which links a database with a knowledge-base to assist in problem-solving.

Lambert Conformal Projection A conic projection used for maps spanning the entire province. It was also used for Forest Resources Inventory (FRI) on FRI Base Map sheets and geographic townships.

Layer A logical set of thematic data described and stored in a map library by subject matter (e.g., soils, roads, water, etc).

Licensing Intellectual Property Licensing intellectual property means either giving or selling the right to an individual or organization to access, use, reproduce, and/or redistribute intellectual property in either its original or value-added form.

Line A set of ordered coordinates that represents the shape of geographic features too narrow to be displayed as an area at the given scale such as; contours, small roads, road centerlines, pipelines or creeks.

Look-up Table A specific tabular data file containing abbreviated codes or numbers which represent specific but related values or items such as in a pick list or option list, such as a listing of tree species.

Map Base A system for defining the extent of mapsheets. The Forest Resource Inventory Base Map and the Ontario Base Map has latitude/longitude as its basic frame and their sheets have true north perpendicular to their east-west axis. The "Township base" is based on geographic township lines; the north-south axis of these is roughly perpendicular to the Lake Ontario shoreline.

Map Extent The geographic extent of a geographic data set, specified by a minimum bounding rectangle.

Map Projection A method in cartography used to more precisely equate locations on a map (which is flat) with their true locations on the earth (which is spherical). Different projection systems have different strengths and weaknesses and therefore different appropriate uses.

Map Scale (see Scale)

Mapsheet (see Tile)

Meta Data Information about data or information, such as information normally found in a header file that describes information which common to all data contained in the body of a file.

Metes and Bounds A term used to describe the legal description of a land parcel as contained in a legal document, land title, licence, etc. The metes and bounds consists of detailed description of direction and geography.

Non-Spatial Refers to information stored in a form or format that is not directly usable by geographic information systems (e.g., hard copy maps or tabular databases).

Ontario Base Map (OBM) Refers to a geographic division of Ontario according to lines of longitude into mapsheets based on the UTM map projection system. In some contexts the acronym "OBM" refers to the Ontario Basic Mapping program.

Patents This grants to an inventor exclusive right to an invention.

Personal Information As defined in the Freedom of Information and Protection of Privacy Act "personal information" means recorded information about an identifiable individual, including:

a) information relating to the race, national or ethnic origin, colour, religion, age, sex, sexual orientation or marital or family status of the individual;

b) information relating to the education or the medical, psychiatric, psychological, criminal or employment history of the individual or information relating to financial transactions in which the individual has been involved;
c) any identifying number, symbol or other particular assigned to the individual;
d) the address, telephone number, fingerprints or blood type of the individual;
e) the personal opinions or views of the individual except where they relate to another individual;
f) correspondence sent to an institution by the individual that is implicitly or explicitly of a private or confidential nature, and replies to that correspondence that would reveal the contents of the original correspondence;
g) the views or opinions of another individual about the individual; and
h) the individual's name where it appears with other personal information relating to the individual or where the disclosure of the name would reveal other personal information about the individual; ("renseignements personnels").

Planimetric Base Feature Geographic features are represented in two planes (two dimesions), therefore, do not provide indications or measures of relief. Planimetric base features are static cadastre features of geology, landscape, water, legal administrative boundaries like ownership, parks, reserves, etc.

Planning Inventory The planning inventory is a specific forest resources inventory required for the preparation, implementation and monitoring of a forest management plan. It is prepared for each specific plan and stays with the perspective forest management plan for the life of that plan. The planning inventory is a generic term which encompasses the following information components: individual coverages in the planning inventory collection, composite planning inventory information product, management decision information, and the three planning coverages (planned harvest and AOC reserves, road use strategy for existing roads and road corridor locations for planned road construction).

Planning Inventory Collection This term refers a specific group of coverages which are used to create a composite planning inventory information product and contain the following information: water, wetlands, ownership and land tenure, parks and reserves, centre-line features and forest polygon coverage. The planning inventory collection is a component of the planning inventory.

Polygon A stream of digitized points approximating the delineation (perimeter) of an area (forest type) on a map. Polygons often are comprised of line segments or arcs which join nodes to produce a polygon.

Point A single x, y coordinate that represents a geographic feature too small to be displayed as a line or area feature, such as a stick nest, trapper cabin or mineral lick.

Precautionary Principle (*Definition in FIM*) In the absence of conclusive information to confirm or verify the presence or features of a value, this principle requires the consideration of the value in the planning of road locations and area of concern prescriptions in order to ensure that the value is protected, based on the high probability of its presence and the potential that it may be affected by forest management operations in a significant and negative way.

This definition of the precautionary principle emphasizes the role of minimal information to ensure that values are considered in forest management planning. This definition supports a "when in doubt protect" approach over a "wait and see what happens" approach.

Precision (A characteristic of Data Quality) A measure of the ability to distinguish between nearly equal values. Precision is the closeness of repeated measurements to each other. Precision is dependent on the method of data collection and is used primarily in relation to numerical measurements. Precision is not a component of accuracy.

Proprietary Something that is used, produced, or marketed under exclusive legal right of the inventor or maker (the creator). A specific organization or process of creating information that is protected by secrecy, patent, or copyright against free competition as to the name, product, composition, or process of manufacture. Proprietary information is protected against free competition by secrecy, patent, copyright, or other intellectual property rights mechanisms and is information for which the creator has exclusive legal rights and sole ownership.

Providing Access to Information Providing access to information means either giving or selling the right to an individual or organization the right or means to approach or reach and retrieve intellectual property.

Quality Assurance All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfill requirements of quality.

Quality Control Comprises the operational techniques and activities that are used to fulfill requirements of quality and quality assurance.

Raw Data (see Data)

Record(s) A record is any record of information however recorded, whether in printed form, on film, by electronic means or otherwise and includes:

a) correspondence, memorandum, a book, a plan, a map, a drawing, a diagram, a pictorial or a graphic work, a photograph, a film, a microfilm, a sound recording, a videotape, a machine-readable record, any other documentary material regardless of physical form or characteristics, and any copy thereof; and

b) any record that is capable of being produced from a machine-readable record under the control of an institution by means of computer hardware and software or any other information storage equipment and technical expertise normally used by the institution.

Records and Other Information In reference to the FIM, records and other information consist of information which has not been described by an information product requirement (a specified representation of information) within the FIM, but are considered information in respect of Crown forests and therefore is information prescribed by this manual.

Re-inventory Remeasurement of an entire survey area to replace an inventory (in reference to forest resources inventory) in its entirety. In the MNR, a re-inventory traditionally consisted of a three year process of (aerial photography, ground surveys, photo-interpretation, data automation and quality assurance).

Relevance (A characteristic of Data Quality) Relevance, completeness and timeliness are largely dependent on an understanding of the business needs for information. If data has relatively good characteristics of quality, but is irrelevant, incomplete or unavailable for processing or decision making, the data will have low overall quality.

Reliability (A characteristic of Data Quality)Reliability refers to the ability of a product or process to perform as expected over a long time period with little or no maintenance. Reliability is also the probability that the data will meet quality specifications.

Repeatability (A characteristic of Data Quality) Repeatability is the ability to reproduce results using the same operator, same equipment, same process and same environment.

Reproducibility (A characteristic of Data Quality) Reproducibility is the ability to reproduce the results using different operators, different equipment and different environmental conditions.

Resolution (A characteristic of Data Quality) Resolution is technology dependent and refers to the capability of visually being able to distinguish the individual parts of an object. It is used and referenced primarily with spatial and image data.

Scale To change the size of an object (geographic feature) without changing its shape. Map scale indicates the relative ratio of the representation of an object on a map to the actual dimensions of an object in two dimensions.

Single-Precision (see Double-Precision) Refers to the level of accuracy (i.e. accuracy of coordinates) for a numeric value based on the number of significant digits that can be stored for the value. Single-precision numbers store up to 7 significant digits.

Site Type (see Ecosite)

Sliver (polygons) A small areal feature which commonly occurs along the borders of polygons following the overlay of two or more coverages. The creation of sliver polygons is normally considered to be an undesirable effect of combing polygons from two or more coverages.

Software A set of computer programs, procedures, and possibly associated documentation concerned with the operation of a data processing system.

Source Data, Records, and Information In reference to the FIM, source data information that is used to create or forms a part of other information such as data collected from a survey which is processed and then re-organized into a structured database. The actual data collected from a specific survey such as the number of trees by species (or tree count) is which is a source of data, records, and information used to determine the species composition for a forest stand as stored within the forest polygon coverage. Similarly the actual data collected from a silivucltural effectiveness monitoring survey is a source of data, records and information used to determine if a forest stand, after receiving a harvest or silvicultural treatment, meets the expected regeneration/ management standards in a forest management plan.

Spatial Data/Information A collection of interrelated geographically referenced data stored without unnecessary redundancy to serve multiple applications as part of a geographic information system. Information about the location and shape of, and relationships among, geographic features, usually stored as coordinates and topology.

Stand (see Forest Stand)

Standard A standard is a document that provides, for common and repeated use, rules, guidelines, or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Measurable parameters established for use as a rule or basis for comparison in measuring or judging quantity, quality, value, capacity, or other characteristics.

Stewardship Inventory The stewardship inventory is a snapshot of the current forest condition at a specific point in time, which provides a benchmark of the distribution and composition of forest cover. The stewardship inventory is a generic term which encompasses the following information components: individual coverages in the stewardship inventory collection and the composite stewardship inventory information product.

Stewardship Inventory Collection This term refers a specific group of coverages which are used to create a composite stewardship inventory information product and contain the following information: water, wetlands, ownership and land tenure, parks and reserves, centre-line features and forest polygon coverage. The stewardship inventory collection is a component of the stewardship inventory.

Tabular Data/Information Data or information that is arranged in the form of a table and organized into a database. Tabular information does not have a geographic (spatial) information component, but is often related to geographic information or geographic features. Tabular information provides descriptive data about an entity, record, person, place, statistic or geographic feature.

Themes A collection of geographic objects defined by the user which are logically organized into groups of layers or themes.

Tile The spatial unit by which geographic data is organized, subdivided, and stored in a map library. A tile can be a regular, geometric shape, such as a mapsheet or an irregular shape such as county or township boundary.

Timeliness (see also Relevance) In reference to the FIM timelines identify when specific information or information products must be provided or when certain roles and responsibilities such as verification or revisions must be completed.

Topology (Topologic Data) Topology is the spatial relationships between connecting or adjacent coverage features (e.g., arcs, nodes, polygons and points). Topological relationships are built from simple elements into more complex elements: points (simplest elements), arcs (sets of connected points), and areas (sets of connect arcs).

Trademark A word, symbol or picture or a combination of these used to distinguish the goods or services of a person or organization from the goods or services of others in the market place.

Universal Transverse Mercator Projection (UTM) A cylindrical projection used for the Ontario Base Map system.

APPENDIX I

TECHNICAL SPECIFICATIONS REFERENCE AND REVISION PROCESS

Technical Specifications

The following technical specifications (under separate cover) are prescribed by Version 1.0 of the FIM.

Planimetric Base Features Information, Part B, Section 3.5
Technical Specifications for Providing Planimetric Base Features Information

Values Information, Part B, Section 4.5
Technical Specifications for Providing Values Information

Inventory Base Features Information, Part B, Section 5.1.2.5
Technical Specifications for Providing Forest Resources Inventory Information

Forest Polygon Coverage Information, Part B, Section 5.1.3.5
Technical Specifications for Providing Forest Resources Inventory Information

Stewardship Inventory Information, Part B, Section 5.2.5
Technical Specifications for Providing Stewardship Inventory Collection Information

Planning Inventory Information, Part B, Section 5.3.5
Technical Specifications for Providing Planning Inventory Collection Information

Annual Report Tabular Information, Part D, Section 2.5
Technical Specifications for Providing Forest Management Planning Automated Reports Modules Information

Annual Report Spatial Information, Part D, Section 3.5
Technical Specifications for Providing Annual Report Spatial Activities Information

Forest Operations Compliance Inspection Information, Part D, Section 5.5
Technical Specifications for Providing Forest Operations Inspection Report Information

Mapping Information, Part E, Section 2.5
Mapping Requirements and Standards for Forest Management Planning Technical Specifications

Process for Revisions to Technical Specifications

Technical specifications provide the conduit for exchanging information between the MNR and the various stakeholders (parties) identified in Part A, Section 2.0 of this manual. The technical specifications describe the details of how information will be exchanged and the form it should take.

The MNR and SFL holders (plan holders) are encouraged to find better ways to exchange information, which in some cases may differ from the technical specifications. Either the MNR or SFL holders (plan holders) may propose a change to the technical specifications at any time. Technical specifications may be revised on a more frequent basis than revisions to the regulated manual. However, modifications to technical specifications should not occur more than once annually.

Proposed changes to the technical specifications should be based on one or more of the following conditions:

- Changes in information technology (information management systems) used by the MNR or SFL holders (plan holders).
- Identification of alternative (more flexible, easier, more efficient, more cost effective, etc.) ways to exchange information while still meeting the requirements prescribed by the FIM. This includes identifying obsolete and ineffective ways of exchanging information.
- Clarification of detailed attribute descriptions. In some cases, proposed changes to detailed attributes may require consideration of changes to, or the effect on, the applicable requirements and standards prescribed in the FIM.
- Identification of improvements to standards in relation to error checking, error handling, quality control, quality assurance or verification.
- Identification of better security measures and information confirmation, receipt, and notification protocols and procedures.
- Changes to file header, creator/user identification, and meta data standards.
- Changes to archiving standards and documentation.
- Other changes to technical specifications which do not require changes to the regulated manual.

Proposed changes to the technical specifications should not prevent the provision of information between the MNR and SFL holders (plan holders). Proposed changes to technical specifications must be submitted to MNR's Director, Science and Information Branch. The proposed change should include the following information:

- A brief description of the proposed change.
- Identification of which technical specifications are affected.
- The applicable conditions identifying why the proposed change is required and any associated time constraints.
- A description of the significance of the change to the current technical specifications as well as the affected stakeholders (parties).

- The expected gains or efficiencies of implementing the proposed change.
- Any issues related to implementing the proposed change.

The MNR's Director, Science and Information Branch will consider the proposal and respond to the proponent with an initial assessment of the proposed change identifying whether the technical specifications require a change or not, the significance of the proposed change, and how the revision process, if required, will occur.

Where required, the MNR may establish a committee or utilize existing committee structures of MNR and/or forest industry representatives to further consider and develop proposed changes to the technical specifications. The MNR or the appropriate committee may be required to identify and confirm all affected parties, set timeframes for considering changes, develop and test proposed revisions, and identify any training and follow-up needs to ensure implementation of the revised technical specifications.

In the event that changes to technical specifications are required, the affected parties must be consulted prior to the changes being made and implemented. The period of notification should be consistent with the significance of the proposed change and impact to the stakeholders (parties) affected.

In most cases, the technical specifications can be modified without affecting the requirements, standards, and timelines described within the FIM. Any modifications to the technical specifications that would cause a change to the requirements for information prescribed in the FIM would first be subject to modification of the manual (revision of the regulation). In these cases a separate process to consider revisions to the manual would be invoked prior to considering revisions or implementing changes to a technical specification.

As long as requirements and standards for information and the timelines to provide it are met, as prescribed by the FIM, and the information can be effectively utilized by both parties, minor changes to technical specifications (such as information exchange formats) may proceed prior to formally making the change to the technical specifications.

APPENDIX II

LISTING OF VALUES BY GROUP, CLASS AND FEATURE TYPE

Key to Identification of Values (Example)

Non-Timber Values	**Values Group**
■ **Fisheries**	Values Class
→ Feeding Area	Feature Type
• *Brown Trout*	*Feature Qualifier*

Note: The Feature Qualifier is part of the Feature Type and is considered to be an important piece of information required for the identification of a value.

Timber Values Group

(Features related to timber production or timber operations)

- **Boat Cache**
  (for resource harvest purposes)

- **Chipper Site**
  - → Permanent
  - → Semi-Permanent
  - → Non-Permanent

- **Mill Site**
  - → Pulp Mill
  - → Sawmill
  - → Other

- **Research Plots**
  - → Fertilization Trial Plot
  - → Forest Insect and Disease Trial Plot
  - → Growth and Yield Trial Plot
  - → Herbicide Trial Plot
  - → Thinning Trial Plot
  - → *Other plots*

- **Scaling Site**

- **Tank**
  - → water
  - → petroleum

- **Tree Improvement Area**
  - → Archive Area
  - → Breeding Hall
  - → Breeding Orchard
  - → Clonal Seed Orchard
  - → Clonal Test
  - → Family Test
  - → Farm Field Test
  - → Progeny Test
  - → Provenance Test
  - → Seedling Seed Orchard
  - → Short Term Test

- **Wood Use Area**
  - → Building Material Area
  - → Fuelwood Area

- **Work Camp**

Non-Timber Values Group

(Features, areas, ecosystems, and land uses which are of ecological, cultural, historical, traditional, and present significance not related to timber production)

- **Cultural Heritage**
  - Archaeological Remains Site
  - Cultural Landscape Site
  - Structural Remains Site
  - Traditional Use Site

- **Fisheries**
  - Bait Fish Lakes
  - Fisheries Habitat
    - *Warm water*
    - *Cool Water*
    - *Cold Water*
  - Feeding Area
    - *Brown Trout*
    - *Common Carp*
    - *Grass Pickerel*
    - *Lake Trout*
    - *Lake Whitefish*
    - *Largemouth Bass*
    - *Rainbow Trout*
    - *Walleye*
    - *Other Fish Species*
  - Migration Areas/Routes
    - *[by species as above]*
  - Nursery Area
    - *[by species as above]*
  - Spawning Area
    - *[by species as above]*
  - Staging Area
    - *Atlantic Salmon*
    - *Chinook Salmon*
    - *Coho Salmon*
    - *Pink Salmon*
    - *Rainbow Trout*
    - *Walleye*

- **Land Use**
  - Commercial Fur
    - *Trapper Cabin*
    - *Trapline Area*
  - Cottage / Residential
    - *Cottage Area, Proposed, Not Remote*
    - *Cottage Area, Proposed, Remote*
    - *Residential Area, Not Remote*
    - *Residential Area, Remote*
    - *Cottage Area, Not Remote*
    - *Cottage Area, Remote*
    - *Cottage Site, Not Remote*
    - *Cottage Site, Remote*
    - *Residential Site, Not Remote*
    - *Residential Site, Remote*
  - Recreation
    - *Access Point*
    - *Boat Cache, Commercial*
    - *Boat Cache, Private*
    - *Designated Camping Site*
    - *Picnic Site*
    - *Clubhouse*
    - *Trail*
    - *Canoe Route*
    - *Trail Segment*
  - Tourism (Commercial)
    - *Potential Tourism Area*
    - *Golf Course*
    - *Inn*
    - *Main Base Lodge, Not Remote*
    - *Main Base Lodge, Remote*
    - *Outpost, Not Remote*
    - *Outpost, Remote*
    - *Recreation Camp*
    - *Shooting Range*
    - *Ski Hill, Not Remote*
    - *Ski Hill, Remote*
    - *Horse Riding Stable*
    - *Commercial Campground*

- → Traditional Land Use Area
  - *Bear Baiting Station*
  - *Berry Picking Area*
  - *Birdwatching Site*
  - *Lookout, Potential*
  - *Traditional Fishing Area*
  - *Traditional Hunting Grounds*
  - *Viewpoint, Potential*
  - *Viewscape*
  - *Lookout*
  - *Semi-Permanent Structure*

- ■ **Natural Heritage**
  - → ANSI
    - *Earth Science*
    - *Life Science*
  - → Evaluated Wetland
  - → Evaluated Wetland Complex
  - → Significant Ecological Area
    - *No-Cut Area*
    - *Designated Old Growth Forest*
    - *Significant Valley*
    - *Significant Woodland*
    - *Wetland, Unevaluated*

- ■ **Vegetation**
  - → Habitat Planning Range
    - *Ginseng*
    - *Hill's Pondweed*
    - *Pitcher's Thistle*
    - *Small White Lady's Slipper Orchid*
    - *Western Silver Leaf Aster*
    - *American Water-Willow*
    - *Cucumber Tree*
    - *Golden Seal*
    - *Pink Milkwort*
    - *Spotted Wintergreen*
    - *Wood Poppy*
    - *Other Vegetation Species - Habitat Planning Ranges*
  - → Peat Production Area
  - → Seed Area
    - *Gene Pool Reserve*
    - *Seed Collection Area*
    - *Seed Production Area*
    - *Seed Zone*
  - → Tree Seed Breeding Zone
  - → Wild Rice Stand

- ■ **Water**
  - → Streams (< 5 metres width)
    - *small permanent streams*
    - *intermittent streams*
    - *seasonally inundated streams*
  - → Water Supply
    - *Spring Water Source*
    - *Water Intake*
  - → Water Line
    - *Seasonally Inundated*
  - → Water Structure
    - *Dam*
    - *Sea Lamprey Barrier*
    - *Lock-gate*

- ■ **Wildlife**
  - → Aquatic Feeding Area
    - *Moose*
  - → Bear Management Area
  - → Breeding Area
    - *Moose Rutting Area*
    - *Deer Rutting Area*
    - *Caribou Rutting Area*
    - *Marten Breeding Area*
  - → Calving / Fawning Site
    - *Caribou*
    - *Deer*
    - *Moose*
    - *Elk*
  - → Den Site
    - *Arctic Fox*
    - *Red Fox*
    - *Grey Fox*
    - *Black Bear*
    - *Wolverine*
    - *Marten*
    - *Grey Wolf*
    - *Polar Bear*
  - → Feeding Area
    - *Beaver Feeding Area (Feed Piles)*

- *Osprey Feeding Area*
- *Karner Blue Butterfly Feeding Area*
- *Bald Eagle Feeding Area*
- *Golden Eagle Feeding Area*

→ Habitat Planning Range
- *Caribou*
- *Elk*
- *Eastern Massasauga Rattlesnake*
- *Grey Fox*
- *Marten*
- *Pileated Woodpecker*
- *Small Mouth Salamander*
- *Southern Flying Squirrel*
- *Spotted Turtle*
- *Wolverine*
- *Fowler's Toad*
- *Lake Erie Watersnake*
- *Great Gray Owl*
- *Hooded Merganser*
- *Common Loon*
- *Red-Shouldered Hawk*
- *Hungarian Partridge*
- *Other Wildlife Species - Habitat Planning Ranges*

→ Mast Producing Area

→ Mineral Lick

→ Nesting Site
- *Cooper's Hawk*
- *Eastern Bluebird*
- *Great Blue Heron Nesting Site/Colony*
- *Peregrine Falcon*
- *Pileated Woodpecker*
- *Red-Shouldered Hawk*
- *Snow Goose Nesting Site/Colony*
- *Trumpeter Swan*
- *Sandhill Crane*
- *Red Tailed Hawk*
- *Other Bird Species – Nesting Sites*

→ Nursery Area
- *Waterfowl Nursery Area*
- *Caribou Nursery Area*
- *Moose Nursery Area*
- *Deer Nursery Area*
- *Grey Wolf Rendezvous Site*

→ Research Plot
- *Bird Banding Station*

→ Resting Area
- *Osprey*

→ Staging Area
- *Waterfowl Staging Area*
- *Deer Staging Area*
- *Monarch Butterfly Staging Area*
- *Polar Bear Staging/Concentration Area*

→ Travel Corridor
- *Caribou Migration Route*
- *Moose Migration Corridor*
- *Waterfowl Migration Corridor*
- *Elk Travel Corridor*

→ Wintering Area
- *Caribou Wintering Area*
- *Deer Wintering Area (Stratum 2)*
- *Deer Yard (Stratum 1)*
- *Moose Early Wintering Area*
- *Moose Late Wintering Area*
- *Moose Wintering Area*
- *Snake Hibernaculum*
- *Waterfowl Winter Concentration Area*
- *Bat Hibernaculum*
- *Elk Wintering Area*

Planimetric Base Features – Geographic Base Features Group

(Physical, permanent, and fixed boundaries based on landscape and topographic features of land, structures, and water)

- ■ **Infrastructure**
  - → Airport
    - *Heliport*
    - *Runway*
    - *Seaplane Base*
  - → Railway
  - → Road
  - → Road Segment
  - → Tower
    - *Communication Tower*
    - *Fire Tower*
    - *Microwave Tower*
    - *Radio Tower*
    - *Navigation Beacon*
    - *Lighthouse*
    - *Lightning Locator*
  - → Transport Line
    - *Aerial Cableway*
    - *Bridge - Pedestrian/Cycle*
    - *Bridge - Railway*
    - *Bridge - Roadway*
    - *Bridge - Railway And Roadway*
    - *Culvert - Railway*
    - *Culvert - Roadway*
    - *Parking Lot Limits*
    - *Road - Edge*
    - *Tunnel - Railway*
    - *Tunnel - Roadway*
    - *Road - Under Construction - Edge*
  - → Transport Point
    - *Culvert - Railway - Symbolized*
    - *Culvert - Roadway - Symbolized*
    - *Turntable - Railway*
  - → Utility Line
    - *Communication Line*
    - *Hydro Line*
    - *Natural Gas Pipeline*
    - *Water Pipeline*
    - *Submerged Natural Gas Pipeline*
    - *Unknown Pipeline*
    - *Unknown Transmission Line*
    - *Submerged Hydro Line*
    - *Submerged Communication Line*
    - *Submerged Water Pipeline*
  - → Utility Site
    - *Fibre Optic Station*
    - *Hydro Station*
    - *Lock*
    - *Pumping Station*
  - → Waste Disposal Site
    - *Compost Disposal*
    - *Hazardous Waste Disposal*
    - *Household Waste Disposal*
    - *Sewage Disposal*
    - *Transfer Station*
    - *Industrial Waste Disposal*

- ■ **Label**
  - → Annotation at 10K
    - *Water*
    - *Road*
    - *Municipal*
    - *Township*
    - *Lots and Concessions*
    - *Other*
  - → Annotation at 20K
    - *[same as above annotation]*
  - → Annotation at 64K
    - *[same as above annotation]*
  - → Annotation at 200K
    - *[same as above annotation]*
  - → Annotation at 640K
    - *[same as above annotation]*
  - → Annotation OBM Cadastral
  - → Annotation OBM Drainage
  - → Annotation OBM Municipal
  - → Annotation OBM Name

- → Annotation OBM Transport
- → Named Place
    - *Bay*
    - *Hamlet*
    - *Island*
    - *Named Place, Data Load*

■ Ontario Base Map (OBM) Features

- → Building
    - *To Scale*
    - *To Scale - Centroid*
    - *Symbolized*
- → Contour
    - *Land*
    - *Land - Approximate*
    - *Land - Auxiliary/Interpolated*
    - *Land – Depression*
- → Miscellaneous Line
    - *Cliff*
    - *Dike*
    - *Fence*
    - *Wall*
    - *Hedge/Hedgerow*
    - *Feature Outline*
    - *Racetrack - Centerline*
    - *Racetrack - Edge*
    - *Mine Headframe*
    - *Monument - Cadastral - Iron Bar*
    - *Monument - Historical*
    - *Monument Horizontal Control*
    - *Post - Mile or Kilometre*
    - *Smoke Stack/Chimney*
- → Digital Terrain Model (DTM)
    - *Hydrographic Breakline*
    - *Transportation Breakline*
    - *Physical Breakline*
- → Spot Height
    - *Spot Height*
    - *Vertical Control Point Photogram*
    - *Water Level - Lake Elevation*
- → Wooded Area
    - *Wooded Area*
    - *Wooded Area - Centroid*

■ Water

- → Drainage Line
    - *Beaver Dam*
    - *Falls - On Double Line River*
    - *Rapids - On Double Line River*
- → Drainage Point
    - *Falls - On Single Line River*
    - *Flow Arrow*
    - *Rapids - On Single Line River*
    - *Rock*
- → Waterbody
    - *Other (includes drainage ditch)*
    - *River (includes rivers, streams)*
    - *Lake (includes lakes, ponds, reservoirs)*
- → Waterbody Segment
    - *Water Area, Seasonally Inundated*
    - *Water Line, Intermittent*
    - *Water Line, Permanent*
    - *Water Area, Permanent*
- → Watershed, Primary
- → Watershed, Secondary
- → Watershed, Tertiary
- → Water Virtual Flow
- → Wetland Line
    - *Permanent*
    - *Seasonally Inundated*

Planimetric Base Features - Administrative Base Features Group

(Physical and non-physical boundaries which represent political, legal, ownership, tax base, land-use zoning, or management and planning decisions)

- **Administrative Boundaries**
  - → Federal Riding
  - → Borough
  - → City
  - → Town
  - → Township
  - → Unincorporated Community
  - → Village
  - → Municipal
  - → County
  - → Regional Municipality
  - → District
  - → Municipal Ward
  - → Province
  - → Provincial Riding
  - → Fire Management Area
  - → Fire Protection Zone
    - *Extensive*
    - *Intensive*
    - *Measured*
    - *Outside of Zone*
  - → Fisheries Management Unit
  - → Forest Management Unit
  - → MNR Area
  - → MNR District
  - → MNR Region
  - → Wildlife Management Unit Legal
  - → Wildlife Management Unit - Data Collection
  - → Wildlife Management Area
  - → Agreement Forest Area
  - → Conservation Authority Area
  - → Site District
  - → Site Region
  - → Ontario Tree Improvement Board (OTIB) Zone

- **Land Use**
  - → Agricultural Land, Crown Land
  - → Crown Leased Land
  - → Mining Claim
  - → Mining Site
    - *Open Pit*
    - *Salt Mine Cavern*
    - *Shaft*
  - → Park or Reserve
    - *Conservation Reserve*
    - *Crown Game Preserves*
    - *Municipal Park*
    - *National Park*
    - *National Wildlife Area*
    - *NGO Nature Reserve*
    - *Provincial Park*
    - *Conservation Area*
  - → Park Zone
  - → Petroleum Well
  - → Pit or Quarry
    - *Pile*
    - *Pit*
    - *Quarry*

- **Legal**
  - → Geographic Township
  - → Lot
  - → Concession
  - → Water Lot
    - *Commercial*
    - *Private*

- **Ownership**
  - → Unceded Land
  - → Crown Land
  - → Private Land
  - → Federal Land
    - *Indian Reserve*
    - *Military*
    - *Other*

APPENDIX III

STEWARDSHIP INVENTORY AND PLANNING INVENTORY ATTRIBUTE LOOK-UP TABLES

About This Appendix

Part B, Section 5.0 of the FIM prescribes several look-up tables which contain options for different tabular attribute information that must be provided in a convenient coded format as part of the stewardship and planning inventories. The look-up tables contained in this appendix are not the definitive source for tabular attribute coding, but provide general guidance regarding the attribute codes, options and corresponding definitions for several tabular attributes that are required in the forest polygon coverage. Forest polygon coverages prepared for inclusion in the stewardship and planning inventories must contain attribute information which is coded according to the schemes described in the *Technical Specifications for Providing Forest Resources Inventory Information*. A valid look-up table option must be chosen for each attribute when the stewardship and planning inventories are prepared for submission to the MNR.

Attribute Look-up Tables

The following attribute tables apply to information in the Forest Polygon Coverage as required for *both* the Stewardship and Planning Inventories:

A.III-1	Ownership Designation
A.III-2	Polygon Type
A.III-3	Source of Data Update
A.III-4	Productive Forest Modifier
A.III-5	Stage of Development
A.III-6	Management Consideration
A.III-7	Accessibility Indicator
A.III-8	Species (for species composition)
A.III-9	Working Group
A.III-10	Age Structure Indicator
A.III-11	Ecosite
A.III-12	Ecosite Source of Data Update
A.III-13	Basal Area Distribution

The following attribute tables apply to the Forest Polygon Coverage as required for the Planning Inventory only:

A.III-14	Availability Indicator
A.III-15	Silvicultural System
A.III-16	Stage of Management
A.III-17	Silvicultural Intensity

A.III-1 Ownership Designation

The *ownership designation* attribute indicates who is the custodian responsible for providing the inventory information about the polygon. (The party responsible for maintaining and providing the forest resources inventory information in accordance with the Forest Information Manual; that is, for determining the polygon description.)

CODE	**OPTION**
MNR	Ministry of Natural Resources
SFL	Sustainable Forest Licence holder
OTH	other (e.g., federal) ***specify***

NOTE:

- If an option of "other" is selected, then a description of the other ownership designation must also be provided.

A.III-2 Polygon Type

The *polygon type* attribute indicates the classification of the area within the polygon boundaries into one of several generalized water and land types.

CODE	OPTION	DEFINITION
Water types (determined from planimetric base coverage information)		
WAT	water	All water areas. No designation (or polygon delineation) between lakes and wide rivers. Therefore, includes lakes, ponds and reservoirs (i.e., inland basin areas containing water) and wide ("two sided") rivers. These rivers are natural or man-made bodies of flowing water, emptying into a stream, river or lake. These are permanent rivers or streams that can be defined by area (versus a line). Generally, these rivers/streams are consistently wider than 20 meters when portrayed at a mapping scale of 1:10,000 or consistently wider than 40 meters when portrayed at a mapping scale of 1:20,000. Smaller/narrower rivers and streams are maintained as linear features in a centre-line coverage(s).
Non-productive forest types (determined from inventory classification)		
TMS	treed wetland	Areas of dry or wet muskeg on which stunted trees occur as widely spaced individuals or in small groups.
OMS	open wetland	Wet areas of mosses, grasses, sedges, and small herbaceous plants, often interspersed with small areas of open water.
BSH	brush and alder	Areas covered with "non-commercial" tree species or shrubs. These areas are normally associated with wetlands or water features, and must not be confused with productive forest areas of similar brush or bush cover which have developed as a result of forest management operations (e.g., areas that have been recently depleted or areas that are below silvicultural standards such as former "barren and scattered" areas).
RCK	rock	Areas of barren or exposed rock (e.g., bedrock, cliff face, talus slope) which may support a few scattered trees, but is less that 25% stocked.

CODE	OPTION	DEFINITION
Non-forested types (determined from inventory classification)		
DAL	developed agricultural land	Lands which are cultivated for growing crops, orchards, floral gardens, etc. These areas may include abandoned agricultural lands.
GRS	grass and meadow	Farm areas devoted to pasture for domesticated animals. These areas may also include abandoned grass and meadows, but are not part of the productive forest land base and do not include "barren and scattered" areas. These areas are similar to barren and scattered, but are located near developed agriculture land or unclassified areas and are usually fenced.
UCL	unclassified	Non-forested areas which were created for specific uses other than timber production, such as roads, railroads, logging camps, mines, utility corridors, logging camps, gravel pits, airports, etc. Most of these areas have been cleared of trees.
OTH	other	Non-forested lands that do not fall into any of the other non-forested polygon type categories. ***specify***
Productive forest types (determined from inventory classification)		
FOR	productive forest	Areas that are capable of producing trees and can support tree growth. These areas may or may not be capable of supporting the harvesting of timber on a sustained yield basis. Some areas may have physical and/or biological characteristics which effect land use. Thus this polygon type includes both production and protection forest areas.

NOTES:

- The previous FRI polygon classification of "unsurveyed" (i.e., stand type = 80) is no longer an acceptable land "classification" / polygon type. All Crown lands areas must be interpreted and designated as one of the non-forested or forested polygon types listed above.
- If an option of "other" is selected, then a description of the "other" non-forested land type must also be provided.

A.III-3 Source of Data Update

The *source of data update* attribute identifies the methodology by which the information stored in the other tabular attributes that are associated with the same polygon was determined (i.e., how the polygon description was determined).

CODE	OPTION	DEFINITION
PBL	planimetric "base" layer	Information that is provided by the MNR (e.g., water or evaluated wetlands).
FRI	forest resources inventory conversion	current polygon description based on data conversion from traditional FRI
API	air photo interpretation	Photography at a conventional scale of 1:10,000, 1:15,840, or 1:20,000
LSP	large scale aerial	Photography at a scale larger than 1:10,000 (e.g., 1:500, 1:1000).
SSP	small scale aerial photography	Photography at a scale smaller than 1:20,000 (e.g., 1:100,000).
MSS	multispectral scanning (digital image)	
RSI	radar satellite imagery	
ISI	infrared satellite imagery	
SSI	spectral satellite imagery	
AIR	aerial survey/ reconnaissance	Visual assessment of a stand from a helicopter or fixed wing aircraft.
EYE	ocular estimate (ground)	Visual assessment of a stand using extensive ground survey methodologies (i.e., no detailed measurements).
OPC	operational cruise	Measuring standing trees to determine the volume of wood on a given tract of land.
SME	extensive silvicultural effectiveness monitoring survey	An appraisal of a forest stand's structure and composition using generalized survey sampling methodologies to determine if regeneration or management objectives have been met (i.e., determine if the expected results were achieved).

CODE	OPTION	DEFINITION
		Extensive survey methods are generally used where there are obvious successes or failure, or to identify problem areas requiring more intensive assessment.
SMI	intensive silvicultural effectiveness monitoring survey	An appraisal of a forest stand's structure and composition using rigorous survey sampling methodologies to determine if regeneration or management objectives have been met (i.e., determine if the expected results were achieved). Intensive survey methods are intended for stands where the status of regeneration is uncertain or specific quantitative data is required to determine the silvicultural effectiveness for operational treatments.
REG	regeneration assessment	Survey of a regenerated area to determine how well the new stand is growing. This includes seeding, survival, and stocking assessments.
VAP	variable area (radius) plot	
FAP	fixed area plot	
MRK	pre-harvest site inspection / marking	Assessment of the trees in a stand for purpose of establishing a silvicultural or operational prescription. Selecting and marking the trees to be harvested and/or the trees to be left to grow; to sustain and enhance the stand for timber management, wildlife habitat management, aesthetics, recreation, biodiversity and other environmental and heritage concerns.
FOC	forest operations compliance inspection	Inspection of a site after silvicultural treatment to determine whether an operator / operations conforms to the approved plan or permit. The evaluation of any harvest, renewal, maintenance, or access forest management activity (e.g., post-harvest site inspection) can be included here.
OTH	other	***specify***

Notes:

- If a combination of sources/methodologies is used to determine the polygon description, then set the set the source of data update field value to OTH (other) and briefly describe the combination/technique that was used (e.g., overlay of radar satellite imagery on multispectral scan image, overlay of radar satellite imagery on infrared satellite imagery).
- If an option of "other" is selected, then a description of the other source (methodology) of data must also be provided.

A.III-4 Productive Forest Modifier

The *productive forest modifier* attribute represents a further classification (subdivision) of productive forest areas based on the presence or absence of physical or biological factors which may influence the ability to practice timber management.

CODE	OPTION	DEFINITION
RP	Production Forest ("regular")	Productive forest areas at various stages of growth and development, including areas that have been recently depleted (by harvest or natural causes) or renewed (by artificial or natural means), that are capable of producing adequate growth of timber to support harvesting on a sustained yield basis. These areas have no significant physical or biological limitations on the ability to practice forest management, but may include areas which pose an operational challenge in terms of harvest, access, protection, silviculture, or renewal (areas formerly called production forest reserves).
MR	Production Forest – Designated Management Reserve	Productive forest areas which are considered to be production forest, but that are unavailable for timber production as determined through the forest management planning process. That is, these areas have been identified as no-cut areas through area of concern planning for the purpose of protecting values (e.g., reserve buffers applied to protect fisheries values, tourism values, or riparian areas / water quality). Designated management reserves are areas that were managed as an operational reserve during previous forest management plan terms. That is, they are actual operational or management reserve areas created by the implementation of forest management operations around them.
PF	Protection Forest	Areas that may have adequate timber growth, but which contain features that pose a significant operational challenge or risk in terms of forest management and site protection. These areas have been designated as a reserve for the purpose of protecting a specific site or ecosystem and are excluded from forest operations.

A.III-5 Stage of Development

The *stage of development* attribute indicates the current state of growth and development for a productive forest stand. Note that some states are best described based on the last major silvicultural treatment that was applied to a stand, if the stand is being managed for timber production.

CODE	OPTION	DEFINITION
LOWM	below stocking / free-to-grow / free growing, well spaced regeneration standards due to past management	Productive forest stands which were previously harvested and have not reached the regeneration standards as described in an approved forest management plan within the estimated timeframe. Further, these areas require additional silvicultural treatment to bring them up to regeneration standards. This does not include areas that have been recently depleted or recently renewed. However, it may include areas which have received renewal treatments in the past that have failed to produce a regenerated forest to the applicable regeneration standards. This option may also include those areas which have traditionally been designated as barren and scattered (i.e., stocking less than 25%) and areas that have been classified as not satisfactorily regenerated (NSR). The former NSR classes of 2 to 5 are included here.
LOWS	below stocking / free-to-grow / free growing well spaced regeneration standards due to natural causes / succession	Productive forest stands which were previously depleted by natural causes and have not reached the regeneration standards as described in an approved forest management plan within the estimated timeframe. Further, these areas require additional silvicultural treatment to bring them up to regeneration standards. This does not include areas that have been recently depleted or recently renewed. However, it may include areas which have received renewal treatments in the past that have failed to produce a regenerated forest to the applicable regeneration standards. This option may also include those areas which have traditionally been designated as barren and scattered (i.e., stocking less than 25%) and areas that have been classified as not satisfactorily regenerated (NSR). The former NSR classes of 2 to 5 are included here.

CODE	OPTION	DEFINITION
DEPH	recently depleted by harvest and has received no regeneration/renewal treatment	Productive forest area that was recently depleted by clearcut harvesting and have not received a silvicultural treatment such as natural regeneration, seeding or planting. These areas do *not* have advanced regeneration, or a distinct or established regeneration layer that would be released and/or protected as part of the depletion operation.
DEPN	recently depleted by natural causes and has received no regeneration/ renewal treatment	Productive forest area that was recently depleted by natural causes (i.e., fire, blowdown, ice damage, insect and disease) and have not received a silvicultural treatment such as natural regeneration, seeding or planting. These areas do *not* have advanced regeneration, or a distinct or established regeneration layer.
NEWP	recently renewed: mainly planted	Productive forest areas which have been regenerated predominantly by planting, but have not received a silvicultural effectiveness monitoring survey and have not been assessed as free-to-grow / free growing.
NEWS	recently renewed: mainly seeded	Productive forest areas which have been regenerated predominantly by seeding, but have not received a silvicultural effectiveness monitoring survey and have not been assessed as free-to-grow / free growing.
NEWN	recently renewed: mainly natural regeneration	Productive forest areas which have been regenerated predominantly by natural means, but have not received a silvicultural effectiveness monitoring survey and have not been assessed as free-to-grow / free growing.
FTGP	free-to-grow / free growing well spaced stand: mainly planted	Productive forest areas which were regenerated predominantly from planted stock and which have been assessed as free-to-grow / free growing based on a silvicultural effectiveness monitoring survey. This includes areas representing a wide range of stand ages, from recently assessed as free-to-grow / free growing to mature and overmature stands, if the stand has not received any further silvicultural treatment.

CODE	OPTION	DEFINITION
FTGS	free-to-grow / free growing well spaced stand: mainly seeded	Productive forest areas which were regenerated predominantly by seeding and which have been assessed as free-to-grow / free growing based on a silvicultural effectiveness monitoring survey. This includes areas representing a wide range of stand ages, from recently assessed as free-to-grow / free growing to mature and overmature stands, if the stand has not received any further silvicultural treatment.
FTGN	free-to-grow / free growing well spaced stand: mainly natural regeneration	Productive forest areas which were regenerated predominantly by natural means and which have been assessed as free-to-grow / free growing based on a silvicultural effectiveness monitoring survey. This includes areas representing a wide range of stand ages, from recently assessed as free-to-grow / free growing to mature and overmature stands, if the stand has not received any further silvicultural treatment.
THNP	received pre-commercial thinning/spacing treatment	Free-growing productive forest areas which have received a mid-rotation partial harvest (reduction in the growing stock) that is designed to meet various objectives such as improving tree spacing, removing trees not suited to the site, and promoting the growth of the best quality trees. The trees selected for removal do not result in a harvest of merchantable volume.
THNC	received commercial thinning/spacing treatment	Free-growing productive forest areas which have received a mid-rotation partial harvest (reduction in the growing stock) that is designed to meet various objectives such as improving tree spacing, removing trees not suited to the site, and promoting the growth of the best quality trees. The harvested trees are removed from the site and used for commercial purposes.
MCUT	received block/strip/first pass or seed-tree cut	The removal of a portion of the existing trees in a stand so that the non-depleted portion of the stand is left primarily to provide a natural seed source for regeneration of the depleted area. Several cutting patterns are available to achieve same goal.

CODE	OPTION	DEFINITION
HARP	received CLAAG/HARO/ HARP harvest treatment	An operational practice applied during harvesting where the objective is to remove some or all of the overstorey while protecting and retaining the understorey advance growth (i.e., trees below a set diameter limit). There are a wide range of harvesting and regeneration treatments that either protect and promote the existing regeneration layer (referred to as advance regeneration or advance growth) and/or promote natural regeneration.
PCUT	received a preparatory cut	A shelterwood silvicultural system stage of management designed to remove undesirable species of any species from the stand and to select trees to remain that will provide the best seed source. The removal of undesirable trees opens the canopy and enables the crowns of remaining seed bearing trees to enlarge; to improve conditions for seed production and natural regeneration.
SCUT	received a seed cut	A shelterwood silvicultural system stage of management where trees are removed from a mature stand in order to create openings in the canopy / create spaces and to prepare sites for natural regeneration while maintaining the seed bearing trees and protecting any existing advance regeneration.
FCUT	received a first removal harvest	A shelterwood silvicultural system stage of management where overstorey trees are removed in one or more harvests in order to release the established seedlings from competition.
LCUT	received a last removal harvest	A shelterwood silvicultural system stage of management where all of the remaining trees in the overstorey are removed. This is the removal of the seed or shelter trees after the regeneration has been effective.
IMPR	received an improvement cut	A selection silvicultural system stage of management where a cut is made in an uneven-aged stand primarily to improve stand composition. distribution and quality by removing less desirable trees of any species.

CODE	OPTION	DEFINITION
SLCT	received a selection harvest	A selection silvicultural system stage of management where individual trees or groups of trees are selected for cutting in order to recover the yield and develop a balanced uneven-aged structure, while providing the cultural measures required for tree growth and seeding establishment.

NOTES:

CLAAG = careful logging around advance regeneration
HARO = harvest and regeneration option
HARP = harvest with regeneration protection

A.III-6 Management Consideration

The *management consideration* attribute indicates whether or not ecological/landscape features or site conditions are present in a productive forest stand which require special consideration during forest management planning.

CODE	OPTION	DEFINITION
NONE	no management consideration	The are no physical or ecological "restrictions" in the site that need to be considered when determining management of the stand.
SOIL	shallow soils	
ROCK	exposed bedrock / rocky outcrops	
SAND	blow sand / exposed fine sand, shallow or no humas	
STEP	steep slopes	
WATR	telluric / highly fluctuating, moving ground water	
WETT	poorly drained – high water table	
DAMG	physical/natural disturbance/damage	A stand composed mainly of trees that are damaged, dead and/or dying due to natural causes (e.g., ice damage, blowdown, insect/disease damage).
POOR	stagnated, poor tree growth – no indicator	
COLD	permafrost	
PASS	bypass	A stand originally scheduled for harvest, but which was not harvested for operability reasons (i.e., due to site conditions). Use of this management consideration option requires that the bypass reason (i.e., the site condition) also be specified, such as steep slopes.

CODE	OPTION	DEFINITION
UPFR	unknown concern – historic production forest reserve (PFR) area	Productive forest land containing obvious physical features which may limit, but does not prevent, the ability to practice forest management. The feature(s) must be considered during forest management planning, but does not make the stand unmanageable. The specific reason/limitation is not known.
U_PF	unknown concern – historic protection forest (PF) area	Productive forest land on which forest management activities cannot normally be practised without incurring deleterious environmental effects because of obvious physical limitations such as steep slopes or shallow soils over bedrock. The specific reason/limitation is not known.
OTHR	other	***specify***

NOTES:

- More than one management consideration options can be assigned to a single stand, if appropriate.
- Two management consideration options are required for stands bypassed due to physical limitations. One option must be PASS and the other option is the reason for the bypass decision (e.g., STEP for steep slopes).
- The two "unknown concern" consideration options are phase-in/transition options. The use of these options is only allowed for a limited time to provide for conversion from traditional Forest Resources Inventory (FRI) stand type codes to the new Stewardship Inventory stand description format until the true nature of the management concern can be determined.
- If an option of "other" is selected, then a description of the other management consideration must also be provided.

A.III-7 Accessibility Indicator

The *accessibility indicator* attribute specifies whether or not there are any restrictions to accessing a productive forest stand. These restrictions may be legal (i.e., ownership), political / land use policy (i.e., land use designation, road closures), and/or a natural barrier. The focus of this field is identification of Crown productive forest stands that are inaccessible and therefore are not considered as part of the managed landbase for forest management planning purposes, but the principle may be applied to any area.

CODE	OPTION	DEFINITION
NON	no accessibility considerations	The area is accessible/reachable.
ISL	island	An area of land totally surrounded by water. The island is not connected to the mainland by a bridge.
PEN	peninsula	An area of land that is nearly surrounded by water and is connected to the mainland by an isthmus (a narrow strip of land).
OWN	ownership	An area of Crown land that is unreachable because it is surrounded by lands owned by an other party/parties (e.g., an area of Crown productive forest land that is not accessible for forest management because it is surrounded by private land).
STO	subject to ownership	An area of land that is owned by a party/parties other than the Crown (e.g., a parcel of private land) and where the access conditions are applied by the land owner. Note that ownership and access conditions can change over time.
LUD	land use designation	An area is not accessible for forest management purposes due to land use designation (e.g., a provincial or federal park, agreement forest, mining claim, native lands, federal lands).
PRC	road closure	An area that is no longer accessible due to the permanent closure of the only road leading into the area.

CODE	OPTION	DEFINITION
NAT	not accessible due to a natural barrier	A productive forest stand that is unreachable due to the physical features of the surrounding area (e.g., a mesa or a productive forest area surrounded by wetlands).
OTH	other access consideration	***specify***

NOTES:

- More than one access consideration option is acceptable per stand, if applicable, but only the most significant (restrictive) access consideration needs to be recorded. That is, if a stand has both an ownership and a physical (e.g., island) access restriction, the access consideration(s) could be listed as either ownership, or as both ownership and island.
- If an option of "other" is selected, then a description of the other access consideration must also be provided.

A.III-8 Species

The *species* attribute is one part of a set of paired attributes commonly referred to as *species composition*. One attribute of the species composition pair identifies the main tree species in a stand and the other attribute indicates the proportion of the stand that the associated species occupies. One or more pairs of species codes and proportion values may be recorded per polygon, but the sum of the proportion values must equal 100%.

Table is in alphabetic order according to species common name.

CODE	SPECIES Common Name	Scientific Name
AL	alder, any / mixed	Alnus spp.
AX	ash, any / mixed	Fraxinus spp.
Ab	ash, black	Fraxinus nigra
Aq	ash, blue	Fraxinus quadrangulata
Ap	ash, pumpkin	Fraxinus profunda
Ag	ash, red (or green)	Fraxinus pennsylvanica
Aw	ash, white	Fraxinus americana
Pl	aspen, largetooth	Populus grandidentata
Pt	aspen, trembling	Populus tremuloides
Bd	basswood	Tilia americana
Be	beech, American	Fagus grandifolia
Bc	birch, cherry	Betula lenta
Bp	birch, European white (or weeping)	Betula pendula
Bg	birch, grey	Betula populifolia
Bw	birch, white (or paper)	Betula papyrifera
By	birch, yellow	Betula alleghaniensis
Gb	black gum	Nyssa sylvatica
Bb	blue-beech	Carpinus caroliniana
Bn	butternut	Juglans cinerea
Ce	cedar, all	Thuja spp.
Cr	cedar, eastern red	Juniperus virginiana
Cw	cedar, eastern white	Thuja occidentalis
Ch	cherry, any / mix	Prunus, spp.
Cb	cherry, black	Prunus serotina
Cv	cherry, choke	Prunus virginiana
Cm	cherry, mazzard	Prunus avium
Cp	cherry, pin (or red, fire, bird)	Prunus pensylvanica
Cd	chestnut, any / mix	Castanea spp.
OC	conifers, other	—
Pd	cottonwood	Populus deltoides
Ct	cucumber tree	Magnolia acuminata
EX	elm, any / mix	Ulmus spp.

CODE	Common Name	Scientific Name
Es	elm, red (or slippery)	Ulmus rubra
Eu	elm, rock	Ulmus thomasii
Ew	elm, white (or American)	Ulmus americana
Bf	fir, balsam	Abies balsamea
OH	hardwoods, other	—
He	hemlock, eastern	Tsuga canadensis
Hi	hickory, all	Carya spp.
Hl	hickory, big shellbark	Carya laciniosa
Hb	hickory, bitternut	Carya cordiformis
Hm	hickory, mockernut	Carya tomentosa
Hp	hickory, pignut	Carya glabra
Hs	hickory, shagbark	Carya ovata
Hc	horsechestnut	Aesculus hippocastanum
Iw	ironwood (also called hop hornbeam)	Ostrya virginiana
Kk	Kentucky coffee tree	Gymnocladus dioicus
La	larch, eastern (also called Tamarack)	Larix, laricina
Le	larch, European	Larix decidua
Lj	larch, Japanese	Larix leptolepis
Lo	locust (black and/or honey)	
Lb	locust, black	Robinia pseudoacacia
Lh	locust, honey	Gleditsia triacanthos
MX	maple, any / mix	Acer spp.
Mb	maple, black	Acer nigrum
Mh	maple, hard (= sugar maple)	—
Mm	maple, Manitoba	Acer negundo
Mt	maple, mountain	Acer spicatum
Mn	maple, Norway	Acer platanoides
Mr	maple, red (also called soft maple)	Acer rubrum
Ms	maple, silver	Acer saccharinum
Mr	maple, soft (= red maple)	—
Mp	maple, striped	Acer pensylvanicum
Mh	maple, sugar (also called hard maple)	Acer saccharum
Am	mountain-ash	Sorbus spp.
OX	oak, any / mix	Quercus spp.
On	oak, black	Quercus nigra
Ob	oak, bur	Quercus macrocarpa
Op	oak, pin	Quercus palustris
Or	oak, red	Quercus rubra
Os	oak, shumard	Quercus shumardii
Osw	oak, swamp white	Quercus bicolor
Ow	oak, white	Quercus alba
Pa	pawpaw	Asimina triloba
PX	pine, any / mix	Pinus spp.
Pn	pine, Austrian	Pinus nigra
Pj	pine, jack	Pinus banksiana

CODE	Common Name	Scientific Name
Pp	pine, pitch	Pinus rigida
Pr	pine, red	Pinus resinosa
Ps	pine, scots	Pinus sylvestris
Pw	pine, white *[eastern white]*	Pinus strobus
Po	poplar, any / mix	Populus spp.
Pb	poplar, balsam	Populus balsamifera
Sa	sassafras	Sassafras albidum
SX	spruce, any / mix	Picea spp.
Sb	spruce, black	Picea mariana
Sc	spruce, Colorado	Picea pungens
Sk	spruce, koyama	Picea koyamai
Sn	spruce, Norway	Picea abies
Sr	spruce, red	Picea rubens
Sw	spruce, white	Picea glauca
Sy	sycamore	Platanus occidentalis
La	tamarack *[= eastern larch]*	Larix laricina
Tt	tulip tree	Liriodendron tulipifera
Wb	walnut, black	Juglans nigra
Wi	willow, any / mix	Salix spp.

A.III-9 Working Group

The *working group* attribute indicates a grouping of productive forest stands for timber management purposes. Stands which are grouped together have the same predominate species composition and are being managed under the same silvicultural system. The grouping of stands is generally labelled based on the species which dictates the management regime to be applied. Therefore, the working group normally indicates the dominant species in a forest stand based on the tree species that occupies the greatest canopy closure or the greatest amount of basal area in the stand as indicated by the species composition attribute.

CODE	OPTION	DEFINITION
BF	balsam fir	
CE	cedar	cedar ***and/or*** red cedar
HE	helmock	
LA	larch	
PJ	jack pine	
PR	red pine	
PS	scots pine	
PW	white pine	
SB	black spruce	
SW	white spruce	pure white spruce ***or*** red and white spruce mix
SX	spruce mix	combination of black, white and/or red spruce
OC	other conifer	any conifer species not listed above
AX	ash mix	combination of black and/or white ash
BG	gray birch	
BW	white birch	
BY	yellow birch	
MH	hard / sugar maple	
MS	soft / red maple	may also include silver maple
MX	maple mix	combination of hard/sugar and/or soft/red maple and/or other maple species
OX	oak mix	combination of red and/or white oak (and/or black oak)
PO	poplar	
PB	balsam poplar	
OH	other hardwoods	beech, basswood, butternut, black cherry, chestnut, White Elm, Black Gum, hickory, ironwood, locust, Paw Paw, Sassafras, Sycamore, tulip tree, black walnut, and/or willow

A.III-10 Age Structure Indicator

The *age structure indicator* attribute designates whether the range of ages of the trees in a forest stand is narrow or wide spread.

CODE	OPTIONS	DEFINITION
E	even-aged	An even-aged forest stand is composed of trees having no, or relatively small, differences in age, usually less than10 to 20 years. Since the trees are approximately the same age, they generally represent one age class, however two distinct age classes may develop (be present) for a limited time, as a result of timber management techniques employed (e.g., shelterwood or modified clear-cut harvesting) or natural events.
U	uneven-aged	A forest stand is considered to be uneven-aged if there are considerable differences in the age of the trees in the stand, usually an age range of more than 10 to 20 years. Uneven-aged stands may contain trees representing three or more age classes, or a continuous range of ages that are spatially intermixed within the stand. These stands are also referred to as "all-aged" stands. Uneven-aged stands being managed for timber production purposes are normally managed under the selection silvicultural system.

A.III-11 Ecosite

Ecosite is an ecological landscape unit (ranging in resolution from thousands to hundreds of hectares) comprised of relatively uniform geology, parent material, soils, topography, and hydrology, and occupied by a consistent complex of successionally related vegetation conditions. Ecosite is also referred to as site type. Currently there are 3 regional sets of ecosite classification systems in use in Ontario.

The ecosite attribute indicates the ecosite(s) present within a polygon. Like the species composition attribute, ecosite is actually a set of paired attributes; one attribute indicates the ecosite code and the other indicates the proportion of the stand area on which the ecosite occurs. One or more pairs of ecosite codes and proportion values may be recorded per polygon, but the sum of the proportion values must equal 100%.

CODE	OPTION
NW Ecosites **non-forested terrestrial ecosites**	
ES1	Beach / Bar
ES2	Sand Dunes
ES3	Bluff
ES4	Cliff
ES5	Talus or Steep Slope
ES6	Crevice / Cave
ES7	Rock Barren
ES8	Alvar
ES9	Sand Barren
ES10	Prairie / Savannah
forested and wetland ecosites	
	NOTE: for codes ES13 thru ES33 each code can have a soil depth modifier: S = shallow, M = medium, D = deep SO ... the full range of codes become ES13S ES13M ES13D
ES11	Red Pine-White Pine-Jack Pine: Very Shallow Soil
ES12	Black Spruce-Jack Pine: Very Shallow Soil
ES13	Jack Pine-Conifer: Dry-Moderately Fresh, Sandy Soil
ES14	Pine-Spruce Mixedwood: Sandy Soil
ES15	Red Pine-White Pine: Sandy Soil
ES16	Hardwood-Fir-Spruce Mixedwood: Sandy Soil
ES17	White Cedar: Fresh-Moist, Coarse-Fine Loamy Soil
ES18	Red Pine-White Pine: Fresh, Coarse Loamy Soil
ES19	Hardwood-Fir-Spruce Mixedwood: Fresh, Sandy-Coarse Loamy Soil
ES20	Spruce-Pine / Feathermoss: Fresh, Sandy-Coarse Loamy Soil
ES21	Fir-Spruce Mixedwood: Fresh, Coarse Loamy Soil
ES22	Spruce-Pine / *Ledum* / Feathermoss: Moist, Sandy-Coarse Loamy Soil

CODE	OPTION
forested and wetland ecosites	
ES23	Hardwood–Fir–Spruce Mixedwood: Moist, Sandy–Coarse Loamy Soil
ES24	Red Pine–White Pine: Fresh, Fine Loamy Soil
ES25	Pine-Spruce / Feathermoss: Fresh, Silty Soil
ES26	Spruce-Pine / Feathermoss: Fresh, Fine Loamy-Clayey Soil
ES27	Fir-Spruce Mixedwood: Fresh, Silty-Fine Loamy Soil
ES28	Hardwood-Fir-Spruce Mixedwood: Fresh, Silty Soil
ES29	Hardwood-Fir-Spruce Mixedwood: Fresh, Fine Loamy-Clayey Soil
ES30	Black Ash Hardwood: Fresh, Silty-Clayey Soil
ES31	Spruce-Pine / Feathermoss: Moist, Silty-Clayey Soil
ES32	Fir-Spruce Mixedwood: Moist, Silty-Clayey Soil
ES33	Hardwood-Fir-Spruce Mixedwood: Moist, Silty-Clayey Soil
ES34	Treed Bog: Black Spruce / *Sphagnum*: Organic Soil
ES35	Poor Swamp: Black Spruce: Organic Soil
ES36	Intermediate Swamp: Black Spruce (Tamarack): Organic Soil
ES37	Rich Swamp: Cedar (Other Conifer): Organic Soil
ES38	Rick Swamp: Black Ash (Other Hardwood): Organic-Mineral Soil
ES39	Open Bog: Ericaceous Shrub / Sedge / *Sphagnum*: Organic Soil
ES40	Treed Fen: Tamarack-Black Spruce / *Sphagnum*: Organic Soil
ES41	Open Poor Fen: Ericaceous Shrub/Sedge / *Sphagnum*: Organic Soil
ES42	Open Moderately Rich Fen: Ericaceous Shrub/Sedge: Organic Soil
ES43	Open Extremely Rich Fen: Ericaceous Shrub / Sedge / Brown Moss: Organic Soil
ES44	Thicket Swamp: Organic-Mineral Soil
ES45	Shore Fen: Organic Soil
ES46	Meadow Marsh: Organic-Mineral Soil
ES47	Sheltered Marsh: Emergent: Sedimentary Peat Substrate
ES48	Exposed Marsh: Emergent: Mineral Substrate
ES49	Open Water Marsh: Submergent / Floating-leaved: Sedimentary Peat Substrate
ES50	Open Water Marsh: Submergent: Mineral Substrate
sparsely vegetated shallow water ecosites	
ES51	Shallow Water: Sparsely Vegetated: Rock
ES52	Shallow Water: Sparsely Vegetated: Muck
ES53	Shallow Water: Sparsely Vegetated: Sand
ES54	Shallow Water: Sparsely Vegetated: Gravel
ES55	Shallow Water: Sparsely Vegetated: Cobble
ES56	Shallow Water: Sparsely Vegetated: Stone

CODE	OPTION
NE Site Types	
ST1	Very Shallow Soil
ST2a	Jack Pine – Coarse Soil
ST2b	Jack Pine – Very Coarse Soil
ST3a	Mixedwood – Medium Soil
ST3b	Mixedwood – Coarse Soil
ST4	Jack Pine – Black Spruce – Coarse Soil
ST5a	Black Spruce – Fine Soil
ST5b	Black Spruce – Medium Soil
ST6a	Mixedwood – Fine Soil
ST6b	Conifer Mixedwood – Medium Soil
ST6c	Hardwood Mixedwood – Coarse Soil
ST7a	Hardwood – Fine Soil
ST7b	Hardwood – Medium Soil
ST8	Black Spruce – Feathermoss – Sphagnum
ST9	Conifer – Moist Soil
ST10	Hardwood – Moist Soil
ST11	Black Spruce – Labrador-tea
ST12	Black Spruce – Speckled Alder
ST13	Conifer – Speckled Alder
ST14	Black Spruce – Leatherleaf
ST15	Tolerant Hardwood Mixedwood
ST16	Sugar Maple – Yellow Birch
Central Site Types	
non-forested terrestrial ecosites	
ES1	Beach / Beach Ridge / Bar
ES2	Dune
ES3	Bluff
ES4	Cliff/Crevice/Cave – acidic/circumneutral
ES5	Cliff/Crevice/Cave – calcareous
ES6	Rock Slope / Talus – acidic/circumneutral
ES7	Rock Slope / Talus – calcareous
ES8	Rock Barren – acidic/circumneutral
ES9	Rock Barren – calcareous (includes alvars)
ES10	Sand Barren/Prairie/Savannah
forested terrestrial and wetland ecosites	
ES11.1	White Pine-Red Pine: dry to moderately fresh soils
ES11.2	White Pine-Red Pine: fresh to moist soils
ES12.1	Red Pine: dry to moderately fresh soils

CODE	OPTION
ES12.2	Red Pine: fresh to moist soils
ES13.1	Jack Pine-White Pine-Red Pine: dry to moderately fresh soils
ES13.2	Jack Pine-White Pine-Red Pine: fresh to moist soils
ES14.1	White Pine-Largetooth Aspen-Red Oak: dry to moderately fresh soils
ES14.2	White Pine-Largetooth Aspen-Red Oak: fresh to moist soils
ES15.1	Jack Pine: dry to moderately fresh soils
ES15.2	Jack Pine: fresh to very moist soils
ES16.1	Black Spruce-Pine: dry to moderately fresh soils
ES16.2	Black Spruce-Pine: fresh to very moist soils
ES17.1	Poplar-White Birch: dry to moderately fresh soils
ES17.2	Poplar-White Birch: fresh to moist soils
ES18.1	Poplar-White Birch-White Spruce-Balsam Fir: dry to moderately fresh soils
ES18.2	Poplar-White Birch-White Spruce-Balsam Fir: fresh to moist soils
ES19.1	Poplar-Jack Pine-White Spruce-Black Spruce: dry to moderately fresh soils
ES19.2	Poplar-Jack Pine-White Spruce-Black Spruce: fresh to moist soils
ES20.1	White Pine-Red Pine-White Spruce-White Birch-Trembling Aspen: dry to moderately fresh soils
ES20.2	White Pine-Red Pine-White Spruce-White Birch-Trembling Aspen: fresh to moist soils
ES21.1	White Cedar-White Pine-White Birch-White Spruce: dry to moderately fresh soils
ES21.2	White Cedar-White Pine-White Birch-White Spruce: fresh to moist soils
ES22	White Cedar-Other Conifer: dry to moist soils
ES23.1	Red Oak-Hardwood: dry to moderately fresh soils
ES23.2	Red Oak-Hardwood: fresh to moist soils
ES24.1	Sugar Maple-Red Oak-Basswood: dry to moderately fresh soils
ES24.2	Sugar Maple-Red Oak-Basswood: fresh to moist soils
ES25.1	Sugar Maple-Beech-Red Oak: dry to moderately fresh soils
ES25.2	Sugar Maple-Beech-Red Oak: fresh to moist soils
ES26.1	Sugar Maple-Basswood: dry to moderately fresh soils
ES26.2	Sugar Maple-Basswood: fresh to moist soils
ES27.1	Sugar Maple-White Birch-Poplar-White Pine: dry to moderately fresh soils
ES27.2	Sugar Maple-White Birch-Poplar-White Pine: fresh to moist soils
ES28.1	Sugar Maple-Hemlock-Yellow Birch: dry to moderately fresh soils
ES28.2	Sugar Maple-Hemlock-Yellow Birch: fresh to moist soils
ES29.1	Sugar Maple-Yellow Birch: dry to moderately fresh soils
ES29.2	Sugar Maple-Yellow Birch: fresh to moist soils
ES30.1	Hemlock-Yellow Birch: dry to moderately fresh soils
ES30.2	Hemlock-Yellow Birch: fresh to moist soils
ES31	Black Spruce-Tamarack: very moist mineral and wet organic soils
ES32	White Cedar-Black Spruce-Tamarack: very moist mineral and wet organic soils
ES33	White Cedar-Other Conifer: very moist to wet soils
ES34	White Cedar-Lowland Hardwoods: very moist to wet soils
ES35	Lowland Hardwoods: fresh to very moist soils

A.III-12 Ecosite Source of Data Update

The *ecosite source of data update* attribute identifies the methodology by which the ecosite information associated with the polygon was determined (i.e., how the polygon's ecosite description was determined).

CODE	OPTIONS	DEFINITION
FRI	forest resources inventory conversion	current polygon description based on data conversion from traditional FRI
API	air photo interpretation	Photography at a conventional scale of 1:10,000, 1:15,840, or 1:20,000
LSP	large scale aerial photography	Photography at a scale larger than 1:10,000 (e.g., 1:500, 1:1000).
SSP	small scale aerial photography	Photography at a scale smaller than 1:20,000 (e.g., 1:100,000).
PSD	air photo interpretation *PLUS* soils data	
MSS	multispectral scanning (digital image)	
AIR	aerial survey/ reconnaissance	Visual assessment of a stand from a helicopter or fixed wing aircraft.
EYE	ocular estimate (ground)	Visual assessment of a stand using extensive ground survey methodologies (i.e., no detailed measurements).
OPC	operational cruise	Measuring standing trees to determine the volume of wood on a given tract of land.
SME	extensive silvicultural effectiveness monitoring survey	An appraisal of a forest stand's structure and composition using generalized survey sampling methodologies to determine if regeneration or management objectives have been met (i.e., determine if the expected results were achieved). Extensive survey methods are generally used where there are obvious successes or failure, or to identify problem areas requiring more intensive assessment.

CODE	OPTIONS	DEFINITION
SMI	intensive silvicultural effectiveness monitoring survey	An appraisal of a forest stand's structure and composition using rigorous survey sampling methodologies to determine if regeneration or management objectives have been met (i.e., determine if the expected results were achieved). Intensive survey methods are intended for stands where the status of regeneration is uncertain or specific quantitative data is required to determine the silvicultural effectiveness for operational treatments.
REG	regeneration assessment	Survey of a regenerated area to determine how well the new stand is growing. This includes seeding, survival, and stocking assessments.
VAP	variable area (radius) plot	
FAP	fixed area plot	
MRK	pre-harvest site inspection / marking	Assessment of the trees in a stand for purpose of establishing a silvicultural or operational prescription. Selecting and marking the trees to be harvested and/or the trees to be left to grow; to sustain and enhance the stand for timber management, wildlife habitat management, aesthetics, recreation, biodiversity and other environmental and heritage concerns.
FOC	forest operations compliance inspection	Inspection of a site after silvicultural treatment to determine whether an operator / operations conforms to the approved plan or permit. The evaluation of any harvest, renewal, maintenance, or access forest management activity (e.g., post-harvest site inspection) can be included here.
ALG	algorithm / model	
OTH	other	***specify***

NOTE:
- If a combination of sources/methodologies is used to determine the ecosite description, then set the set the source of data update field value to OTH (other) and briefly describe the combination/technique that was used (e.g., air photo interpretation plus operational cruise).
- If an option of "other" is selected, then a description of the other source (methodology) of data must also be provided.

A.III-13 Basal Area Distribution

Basal area distribution information is a breakdown of the total basal area of a productive forest stand by stand quality and diameter class range. **Basal area distribution information is only mandatory for productive forest stands being managed under the selection silvicultural system**.

Stand quality is a subjective determination of whether the individual trees in a stand are or are not suitable for timber production based on a visual assessment of stem form, canopy form, general health and vigour, and any external evidence of defects or disease. The two stand quality classes are: acceptable growing stock (AGS) and unacceptable growing stock (UGS).

- Acceptable growing stock is defined as trees exhibiting good health, vigor and form that are expected to maintain or improve their present quality over the next 20 years (or cutting cycle term). Trees of AGS quality are visually free of defect and disease.

- Unacceptable growing stock is defined as poor quality trees exhibiting poor health, vigor or form that cannot reasonably be expected to improve or maintain their present quality (i.e., are expected to decline in quality) over the next 20 years (or cutting cycle term).

The detailed basal area information calculated for a productive forest stand is grouped into four diameter (dbh) classes/ranges based on size and potential product use. These classes are:

Class Name	Class Diameter Range	Actual Diameter Range
polewood	10 – 24 cm	9.1 – 25.0 cm
small sawlogs	26 – 36 cm	25.1 – 37.0 cm
medium sawlogs	38 – 48 cm	37.1 – 49.0 cm
large sawlogs	50+ cm	49.1+ cm

NOTE:

- trees less than 9.1 centimeters in diameter are ignored.

A basal area measurement must be computed and recorded for each quality and diameter class combination. That is, each stand quality class has four diameter classes associated with it. Therefore this attribute is actually a set of *eight paired* values; a basal area distribution category code (see table below) plus the actual measured/computed basal area value associated with that category. A value must be assigned to every category/code; zero is an acceptable value.

CODE	DEFINITION
APOLE	acceptable polewood
ASLOG	acceptable small sawlogs
AMLOG	acceptable medium sawlogs
ALLOG	acceptable large sawlogs
UPOLE	unacceptable polewood
USLOG	unacceptable small sawlogs
UMLOG	unacceptable medium sawlogs
ULLOG	unacceptable large sawlogs

A.III-14 Availability Indicator

The *availability indicator* attribute identifies which portions of the managed Crown production forest are available for timber production or not.

The *availability indicator* attribute is only part of the forest stand description in a Primary Forest Polygon Coverage that is part of a *Planning* Inventory.

CODE	OPTIONS	DEFINITION
A	available	Crown production forest that can be managed for timber production.
U	unavailable	Managed Crown production forest that is not available for timber production as a result of reserve prescriptions developed in a forest management plan (e.g., area of concern reserve).

A.III-15 Silvicultural System

The *silvicultural system* attribute indicates the process by which a productive forest stand will be managed for timber production purposes. The process/system is classified according to the method of harvesting that will be used.

The *silvicultural system* attribute is only part of the forest stand description in a Primary Forest Polygon Coverage that is part of a *Planning* Inventory and is required for all "available" stands.

CODE	OPTIONS	DEFINITION
CC	clearcut	A system of regenerating an even-aged forest stand in which new seedlings become established in fully exposed micro-environments after most or all of the existing trees have been removed. Regeneration is artificial or natural.
SH	shelterwood	An even-aged system where mature trees are harvested in a series of two or more cuts for the purpose of obtaining regeneration under the shelter of residual trees, whether by cutting uniformly over the entire stand area or in narrow strips or groups. Regeneration is natural or artificial.
SE	selection	An uneven aged system where mature and/or undesirable trees are removed individually or in small groups over the whole area. Regeneration is generally natural.

A.III-16 Stage of Management

The *stage of management* attribute indicates the next harvest or cut treatment that is scheduled to occur in a productive forest stand being managed for timber production. The acceptable value of this attribute is related to / based on the value of the silvicultural system attribute.

The *stage of management* attribute is only part of the forest stand description in a Primary Forest Polygon Coverage that is part of a Planning Inventory and is required for all "available" stands.

CODE	**OPTIONS**	**DEFINITION**
THNP	**do a pre-commercial thinning/spacing treatment**	Free-growing productive forest areas which are scheduled to received a mid-rotation partial harvest (a reduction in the growing stock) that is designed to meet various objectives such as improving tree spacing, removing trees not suited to the site, and promoting the growth of the best quality trees. The trees selected for removal do not result in a harvest of merchantable volume.
clearcut silvicultural system options		
THNC	**do a commercial thinning/spacing treatment**	Free-growing productive forest areas which are scheduled to received a mid-rotation partial harvest (a reduction in the growing stock) that is designed to meet various objectives such as improving tree spacing, removing trees not suited to the site, and promoting the growth of the best quality trees. The harvested trees are removed from the site and used for commercial purposes.
MCUT	**do a block/strip/first pass or seed-tree cut**	Free-growing productive forest areas which are scheduled to have a of portion of the existing trees in a stand removed so that the non-depleted portion of the stand is left primarily to provide a natural seed source for regeneration of the depleted area. Several cutting patterns are available to achieve same goal.
HARP	**do a CLAAG/ HARO/HARP harvest treatment**	Free-growing productive forest areas which are scheduled for harvest where the objective is to remove some or all of the overstorey while protecting and retaining the understorey advance growth (i.e., trees below a set diameter limit). There are a wide range of harvesting and regeneration treatments that either protect and promote the existing regeneration

CODE	OPTIONS	DEFINITION
		layer (referred to as advance regeneration or advance growth) and/or promote natural regeneration.
CCUT	do a conventional	Free-growing productive forest areas which are scheduled for removal of most or all of the existing trees in a stand (or a number of adjacent stands) in one operation, so that new seedlings become established in a fully exposed micro-environments.
shelterwood silvicultural system options		
PCUT	do a preparatory cut	Free-growing productive forest areas which are scheduled for a shelterwood silvicultural system stage of management designed to remove undesirable species of any species from the stand and to select trees to remain that will provide the best seed source. The removal of undesirable trees opens the canopy and enables the crowns of remaining seed bearing trees to enlarge; to improve conditions for seed production and natural regeneration.
SCUT	do a seed cut	Free-growing productive forest areas which are scheduled for a shelterwood silvicultural system stage of management where trees are removed from a mature stand in order to create openings in the canopy / create spaces and to prepare sites for natural regeneration while maintaining the seed bearing trees and protecting any existing advance regeneration.
FCUT	do a first removal harvest	Free-growing productive forest areas which are scheduled for a shelterwood silvicultural system stage of management where overstorey trees are removed in one or more harvests in order to release the established seedlings from competition.
LCUT	do a last removal harvest	Free-growing productive forest areas which are scheduled for a shelterwood silvicultural system stage of management where all of the remaining trees in the overstorey are removed. This is the removal of the seed or shelter trees after the regeneration has been effective.

selection silvicultural system options		
IMPR	do an improvement cut	Free-growing productive forest areas which are scheduled for a selection silvicultural system stage of management where a cut is made in an uneven-aged stand primarily to improve stand composition. distribution and quality by removing less desirable trees of any species.
SLCT	do a selection harvest	Free-growing productive forest areas which are scheduled for a selection silvicultural system stage of management where individual trees or groups of trees are selected for cutting in order to recover the yield and develop a balanced uneven-aged structure, while providing the cultural measures required for tree growth and seeding establishment.

NOTES:

- Pre-commercial thinning may be employed in stands being managed under either the clearcut or shelterwood silvicultural system.

- Acronyms:
  CLAAG => careful logging around advance regeneration
  HARO => harvest and regeneration option
  HARP => harvest with regeneration protection

A.III-17 Silvicultural Intensity

The *silvicultural intensity* attribute provides an indication of the level of effort/cost applied to managing a productive forest stand (i.e., the relative degree of effort required to achieve a free-growing stand) and only applies to stands being managed under the clearcut silvicultural system.

The *silvicultural intensity* attribute is only part of the forest stand description in a Primary Forest Polygon Coverage that is part of a Planning Inventory.

CODE	OPTIONS	DEFINITION
<null>	no intensity	The setting of an intensity level is not applicable for the area. This option is applied to stands that are not being managed for timber production (e.g., unavailable stands / stands with access restrictions).
PRSNT	present	This intensity class represents the existing natural forest and future forest following natural disturbances.
EXTEN	extensive	This intensity class represents the application of inexpensive silvicultural treatment options such as natural regeneration and protection from fires and insects.
BASC1	basic, level 1	This intensity class represents the application of mid-cost silvicultural treatments such as assisted natural regeneration (i.e., scarification, cone scattering, or direct seeding).
BASC2	basic, level 2	This intensity class represents the application of slightly higher but still mid-cost silvicultural treatments such as assisted natural regeneration ***plus*** subsequent release of trees from immediate competing vegetation.
INTN1	intensive, level 1	This intensity class represents the application of an expensive silvicultural management regime/sequence such as site preparation, plant nursery stock, vegetation management, and pre-commercial thinning.
INTN2	intensive, level 2 or elite	This intensity class represents the application of an intensive, level 1 silvicultural treatment regime ***plus*** multiple tendings and cleanings and/or tne planting of genetically improved nursery stock. This silvicultural intensity level has also been referred to as "elite".

NOTE: Codes based on Strategic Forest Management Model (SFMM)

APPENDIX IV

CONVERSION FROM TRADITIONAL FOREST RESOURCES INVENTORY ATTRIBUTES TO STEWARDSHIP INVENTORY AND PLANNING INVENTORY ATTRIBUTES

Appendix IV identifies the *recommended* conversion from the traditional Forest Resources Inventory (FRI) stand type attribute into a specific set of attributes contained in the forest polygon coverage and required as part of the stewardship and planning inventories. However, if the use of the traditional stand type codes has deviated from their original intent/definition, the user may need to adjust the value assigned to the required forest polygon coverage attributes. Refer to Appendix III for a full listing of attribute options used in the forest polygon coverage.

How to Apply This Appendix

Each set of conversion tables is organized by the traditional FRI stand type code and identifies how each stand type code can be converted to the applicable attributes required in the stewardship and/or planning inventories. Each traditional FRI stand type code has a set of two conversion tables:

1. Conversion of traditional FRI stand type to common attributes in both the stewardship and planning inventories.
2. Conversion of traditional stand type to additional attributes required in the planning inventory only.

At the beginning of each set of conversion tables the definition of the traditional FRI stand type code is provided. In some cases, only one conversion table is required. Each conversion table has three columns of information that describe the required attributes for the stewardship and planning inventories and their relationship to each traditional FRI stand type:

Attribute:

The attribute column identifies the applicable attributes in either the stewardship inventory and/or the planning inventory which correspond and can be cross-referenced to the traditional FRI stand type code.

Value:

The value column identifies the abbreviated pick list item from the applicable stewardship and/or planning inventory attribute.

Comment / Defintion:

The information contained in this column provides comments or direction regarding the selection of one or more attributes and also provides the definition of each stewardship and/or planning inventory attribute.

Stand Type: 20 Regular Production, Even-aged

The intent of this stand type code is to represent productive forest areas that would be managed under an even-aged silvicultural system, usually the clearcut system. These areas have a stocking level greater than 30% and there are no physical restrictions to be considered when managing the stand. Stand Type 20 is also used as the default code for this type of stand (> 30% stocked, no management considerations) if the silvicultural system of a stand is unknown.

Required Attributes for the Stewardship and Planning Inventories

Attribute	**Value**	**Comment/Definition**
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	FTGN	=> FTG/FGWS – natural (***default***)
	FTGS	=> FTG/FGWS – seeded
	FTGP	=> FTG/FGWS – planted
	THNP	=> received pre-commercial thinning/spacing
	THNC	=> received commercial thinning/spacing
	MCUT	=> received block/strip/first pass/ seed-tree cut
	HARP	=> received CLAAG/HARO/HARP cut
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	**Value**	**Comment/Definition**
Silvicultural System	CC	=> clearcut
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	THNP	=> pre-commercial thinning/spacing
	THNC	=> commercial thinning/spacing
	MCUT	=> block/strip/first pass/seed-tree cut
	HARP	=> CLAAG/HARO/HARP CUT
	CCUT	=> conventional clearcut
Availability Indicator	A	=> available

Stand Type: 21 Regular Production, Selection

The intent of this stand type code is to represent productive forest areas being managed under the selection silvicultural system. These stands are uneven-aged, have a stocking level greater than 30%, and there are no physical restrictions to be considered when managing the stand.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	U	=> uneven aged
Stage of Development		***select one, as appropriate:***
	FTGN	=> FTG/FGWS – natural (***default***)
	IMPR	=> received improvement cut
	SLCT	=> received selection harvest
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System	SE	=> selection
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	IMPR	=> improvement cut
	SLCT	=> selection harvest
Availability Indicator	A	=> available

Stand Type: 22 Regular Production, Multi-Story, Even-aged

The intent of this stand type code is to represent productive forest areas being managed via the shelterwood silvicultural system. The stands are considered to be even-aged, even though more than one age class and a storied canopy structure may be present at some time during the life of the stand due to the specific management technique(s) employed. These stands have a stocking level greater than 30% and there are no physical restrictions to be considered when managing the stand.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	PF	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	FTGN	=> FTG/FGWS – natural (***default***)
	FTGS	=> FTG/FGWS – seeded
	FTGP	=> FTG/FGWS – planted
	PCUT	=> received preparatory cut
	SCUT	=> received seed cut
	FCUT	=> received first removal harvest
	LCUT	=> received final/last removal harvest
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory only

Attribute	Value	Comment/Definition
Silvicultural System	SH	=> shelterwood
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	PCUT	=> preparatory cut
	SCUT	=> seed cut
	FCUT	=> first removal harvest
	LCUT	=> final/last removal harvest
Availability Indicator	A	=> available

Stand Type: 23 Regular Production, Plantation

The intent of this stand type code is to represent productive forest areas that were established via planting and are being intensively managed under the clearcut or shelterwood silvicultural system; these are high cost plantation areas. These areas have a stocking level greater than 30% and there are no physical restrictions to be considered when managing the stand.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	PR	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	FTGP	=> FTG/FGWS – planted ***(default)***
	FTGS	=> FTG/GGWS - seeded
	THNP	=> received pre-commercial thin
	THNC	=> received commercial thin
	MCUT	=> received block/strip/first pass/ seed-tree cut
	HARP	=> received CLAAG/HARO/HARP cut
	PCUT	=> received preparatory cut
	SCUT	=> received seed cut
	FCUT	=> received first removal harvest
	LCUT	=> received final/last removal harvest
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity		***select one, as appropriate:***
	INTN1	=> intensive, level 1
	INTN2	=> intensive, level 2/elite

Stand Type: 23 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Stage of Management		***select one, as appropriate:***
	THNP	=> pre-commercial thin/space
	THNC	=> commercially thin
	MCUT	=> block/strip/first pass/seed-tree cut
	HARP	=> CLAAG/HARO/HARP cut
	CCUT	=> conventional clearcut
	PCUT	=> preparatory cut
	SCUT	=> seed cut
	FCUT	=> first removal harvest
	LCUT	=> final/last removal harvest
Availability Indicator	A	=> available

Stand Type: 25
Production Forest Reserve, (PFR) Even-aged

The intent of this stand type code is to represent productive forest areas that would be managed under an even-aged silvicultural system, usually the clearcut system. These areas have a stocking level greater than 30% and contain a physical feature/factor which needs to be considered when managing the stand, but which does not make the stand unmanageable. Stand Type 25 is also used as the default code for this type of stand (> 30% stocked, with management considerations) if the silvicultural system of a stand is unknown.

Required Attributes for the Stewardship and Planning Inventories

Attribute	**Value**	**Comment/Definition**
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	FTGN	=> FTG/FGWS – natural (***default***)
	FTGS	=> FTG/FGWS – seeded
	FTGP	=> FTG/FGWS – planted
	THNP	=> received pre-commercial thin
	THNC	=> received commercial thin
	MCUT	=> received block/strip/first pass/ seed-tree cut
	HARP	=> received CLAAG/HARO/HARP cut
Management Consideration		***select one, as appropriate:***
	UPFR	=> unknown – PFR ***(default)***
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 25 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System	CC	=> clearcut
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	THNP	=> pre-commercial thinning/spacing
	THNC	=> commercial thinning/spacing
	MCUT	=> block/strip/first pass/seed-tree cut
	HARP	=> CLAAG/HARO/HARP cut
	CCUT	=> conventional clearcut
Availability Indicator	A	=> available

Stand Type: 26 Production Forest Reserve (PFR), Selection

The intent of this stand type code is to represent productive forest areas being managed via the selection silvicultural system. These stands are uneven-aged, have a stocking level greater than 30% and contain a physical feature/factor which needs to be considered when managing this area, but which does not make the stand unmanageable.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	U	=> uneven aged
Stage of Development		***select one, as appropriate:***
	FTGN	=> FTG/FGWS – natural ***(default)***
	IMPR	=> received improvement cut
	SLCT	=> received selection harvest
Management Consideration		***select one, as appropriate:***
	UPFR	=> unknown – PFR ***(default)***
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 26 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System	SE	=> selection
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	IMPR	=> improvement cut
	SLCT	=> selection harvest
Availability Indicator	A	=> available

Stand Type: 27 Production Forest Reserve (PFR), Multi-Story, Even-aged

The intent of this stand type code is to represent productive forest areas being managed via the shelterwood silvicultural system. These stands are considered to be even-aged, even though more than one age class and a storied canopy structure may be present at some time during the life of the stand due to the specific management technique(s) employed. These stands have a stocking level greater than 30% and contain a physical feature/factor which needs to be considered when managing this area, but which does not make the stand unmanageable.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	FTGN	=> FTG/FGWS – natural ***(default)***
	FTGS	=> FTG/FGWS – seeded
	FTGP	=> FTG/FGWS – planted
	PCUT	=> received preparatory cut
	SCUT	=> received seed cut
	FCUT	=> received first removal harvest
	LCUT	=> received final/last removal harvest
Management Consideration		***select one, as appropriate:***
	UPFR	=> unknown – PFR ***(default)***
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 27 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System	SH	=> shelterwood
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	PCUT	=> preparatory cut
	SCUT	=> seed cut
	FCUT	=> first removal harvest
	LCUT	=> final/last removal harvest
Availability Indicator	A	=> available

Stand Type: 28 Production Forest Reserve (PFR), Plantation

The intent of this stand type code is to represent productive forest areas that were established via planting and which are being intensively managed under the clearcut or shelterwood silvicultural system; these are high cost plantation areas. These areas have a stocking level greater than 30% and contain a physical feature/factor which needs to be considered when managing this area, but which does not make the stand unmanageable.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	PR	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	FTGP	=> FTG/FGWS – planted ***(default)***
	FTGS	=> FTG/FGWS – seeded
	THNP	=> received pre-commercial thin
	THNC	=> received commercial thin
	MCUT	=> received block/strip/first pass/ seed-tree cut
	HARP	=> received CLAAG/HARO/HARP cut
	PCUT	=> received preparatory cut
	SCUT	=> received seed cut
	FCUT	=> received first removal harvest
	LCUT	=> received final/last removal harvest
Management Consideration		***select one, as appropriate:***
	UPFR	=> unknown – PFR ***(default)***
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 28 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity		***select one, as appropriate:***
	INTN1	=> intensive, level 1
	INTN2	=> intensive, level 2/elite
Stage of Management		***select one, as appropriate:***
	THNP	=> pre-commercial thin/space
	THNC	=> commercially thin
	BLCK	=> block/strip/first pass/seed-tree cut
	HARP	=> CLAAG/HARO/HARP cut
	CCUT	=> conventional clearcut
	PCUT	=> preparatory cut
	SCUT	=> seed cut
	FCUT	=> first removal harvest
	LCUT	=> final/last removal harvest
Availability Indicator	A	=> available

Stand Type: 30 Barren and Scattered (B&S), Regular Production, Even-aged

The intent of this stand type code is to represent productive forest areas that currently have few trees on them, either young stands following a stand-replacing disturbance or a mature stand with low stocking. These areas have a stocking level less than or equal to 30% and there are no physical restrictions which need to be considered when managing the stand. Stand Type 30 is also used as the default code for this type of stand (<=30% stocked, no management considerations).

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	DPLH	=> recently depleted – harvest
	DEPN	=> recently depleted – natural
	LOWM	=> below stocking/FTG/FGWS standards due to past management activities
	LOWS	=> below stocking/FTG/FGWS standards due to natural causes/succession ***(default)***
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity	PRSNT	=> present

Stand Type: 30 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Stage of Management		***select one, as appropriate:***
	NEWP	=> renewal - plant
	NEWS	=> renewal - seed
	NEWN	=> renewal - natural
	MCUT	=> block/strip/first pass/seed-tree cut
	HARP	=> CLAAG/HARO/HARP cut
	CCUT	=> conventional clearcut
	LCUT	=> last/final removal harvest
Availability Indicator	A	=> available

Stand Type: 31 Barren and Scattered (B&S), Regular Production, Selection

The intent of this stand type code is to represent low stocked, productive forest areas being managed via the selection silvicultural system. These stands are uneven-aged, have a stocking level less than or equal to 30% and there are no restrictions to be considered when managing the use of this area. This code could be used to identify selection stands which recently received a heavy harvest.

Required Attributes for the Stewardship and Planning Inventories

Attribute	**Value**	**Comment/Definition**
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	U	=> uneven aged
Stage of Development		***select one, as appropriate:***
	DEPH	=> recently depleted - harvest
	DEPN	=> recently depleted - natural
	LOWM	=> below stocking/FTG/FGWS standards due to past management activities
	LOWS	=> below stocking/FTG/FGWS standards due to natural causes/succession (***default***)
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	**Value**	**Comment/Definition**
Silvicultural System	SE	=> selection
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	NEWN	=> renewal - natural
	NEWS	=> renewal – seed
	SLCT	=> selection harvest
Availability Indicator	A	=> available

Stand Type: 32 Barren and Scattered (B&S), Production Forest Reserve (PFR), Even-aged

The intent of this stand type code is to represent productive forest areas that currently have few trees on them, either young stands following a stand-replacing disturbance or a mature stand with low stocking. These areas have a stocking level less than or equal to 30% and contain a physical feature/factor which needs to be considered when managing the stand, but which does not make the stand unmanageable. Stand Type 32 is also used as the default code for this type of stand (<=30% stocked, with management considerations).

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	DEPH	=> recently depleted - harvest
	DEPN	=> recently depleted - natural
	LOWM	=> below stocking/FTG/FGWS standards due to past management activities
	LOWS	=> below stocking/FTG/FGWS standards due to natural causes/succession ***(default)***
Management Consideration		***select one, as appropriate:***
	UPFR	=> unknown – PFR ***(default)***
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 32 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	NEWP	=> renewal - plant
	NEWS	=> renewal – seed
	MCUT	=> block/strip/first pass/seed-tree cut
	HARP	=> CLAAG/HARO/HARP cut
	CCUT	=> conventional clearcut
Availability Indicator	A	=> available

Stand Type: 33 Barren and Scattered (B&S), Production Forest Reserve (PFR), Selection

The intent of this stand type code is to represent low stocked, productive forest areas being managed via the selection silvicultural system. These stands are uneven-aged, have a stocking level less than or equal to 30%, and contain a physical feature/factor which needs to be considered when managing the stand, but which does not make the stand unmanageable.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	U	=> uneven aged
Stage of Development		***select one, as appropriate:***
	DEPH	=> recently depleted - harvest
	DEPN	=> recently depleted - natural
	LOWM	=> below stocking/FTG/FGWS standards due to past management activities
	LOWS	=> below stocking/FTG/FGWS standards due to natural causes/succession (***default***)
Management Consideration		***select one, as appropriate:***
	UPFR	=> unknown – PFR (***default***)
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 33 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System	SE	=> selection
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	NEWP	=> renewal - plant
	NEWS	=> renewal – seed
	SLCT	=> selection harvest
Availability Indicator	A	=> available

Stand Type: 35 Not Satisfactorily Regenerated (NSR) II

The intent of this stand type code is to represent productive forest areas that have regenerated to satisfactory stocking (Ontario standards or as specified in the management plan), but which have not yet attained free-to-grow or free growing, well-spaced status and which requires tending. The assumption here is that tending involves one or more aerial spray applications of herbicide on the overtopping vegetation that can be carried out at current cost.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	PR	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	NEWN	=> recently renewed – natural ***(default)***
	NEWS	=> recently renewed – seeded
	NEWP	=> recently renewed – planted
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity	PRSNT	=> present
Stage of Management		***select one, as appropriate:***
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
Availability Indicator	A	=> available

Stand Type: 36 Not Satisfactorily Regenerated (NSR) III

The intent of this stand type code is to represent productive forest areas which have not yet regenerated to satisfactory stocking (Ontario standards or as specified in the management plan), but could be regenerated through normal treatment methods at current costs.

Required Attributes for the Stewardship and Planning Inventories

Attribute	**Value**	**Comment/Definition**
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	DEPH	=> recently depleted – harvest
	DEPN	=> recently depleted – natural
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural ***(default)***
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	**Value**	**Comment/Definition**
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity	EXTEN	=> extensive
Stage of Management		***select one, as appropriate:***
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
Availability Indicator	A	=> available

Stand Type: 37 Not Satisfactorily Regenerated (NSR) IV

The intent of this stand type code is to represent productive forest areas that have not regenerated to satisfactory stocking (Ontario standards or as specified in the management plan), but could be regenerated using existing technology at costs of 50% to 100% greater than current costs. This category will most commonly apply to older cutovers with heavy residual content or difficult terrain.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
	LOWM	=> below stocking/FTG/FGWS standards due to past management activities
	LOWS	=> below stocking/FTG/FGWS standards due to natural causes/succession ***(default)***
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity	EXTEN	=> extensive
Stage of Management		***select one, as appropriate:***
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
Availability Indicator	A	=> available

Stand Type: 38 Not Satisfactorily Regenerated (NSR) V

The intent of this stand type code is to represent productive forest areas that have not regenerated to satisfactory stocking (Ontario standards or as specified in the management plan) and cannot be regenerated using existing technology except at costs greater than 100% over current treatment costs. This category will most commonly apply to cutovers with very heavy residual content or very difficult terrain, wetness, or access problems. These classes can be subdivided where:

(i) Costs are excessive due to lack of access. A change in accessibility would allow these lands to be reclassified to NSR class 3 or 4.
(ii) Costs are excessive due to terrain or technical problems.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	DEPH	=> recently depleted - harvest
	DEPN	=> recently depleted - natural
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
	LOWM	=> below stocking/FTG/FGWS standards due to past management activities
	LOWS	=> below stocking/FTG/FGWS standards due to natural causes/succession ***(default)***
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Stand Type: 38 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity	EXTEN	=> extensive
Stage of Management		***select one, as appropriate:***
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
Availability Indicator	A	=> available

Stand Type: 39 Not Sufficiently Regenerated (NSR) VI

The intent of this stand type code is to represent productive forest areas that have been depleted:

(i) within the last five years and are not yet subject to the fifth-year stocking assessment, or

(ii) five or more years in the past and are regenerated to satisfactory stocking (Ontario standards or as specified in the management plan) and do not require tending, but cannot be classed as free-to-grow / free growing well-spaced because of insufficient height or height growth.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	RP	=> production forest
Age Structure Indicator	E	=> even aged
Stage of Development		***select one, as appropriate:***
	DEPH	=> recently depleted - harvest
	DEPN	=> recently depleted - natural
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural ***(default)***
Management Consideration	NONE	=> no management considerations
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
Silvicultural Intensity		***select one, as appropriate:***
	INTN1	=> intensive, level 1
	INTN2	=> intensive, level 2/elite
Stage of Management		***select one, as appropriate:***
	NEWP	=> recently renewed – planted
	NEWS	=> recently renewed – seeded
	NEWN	=> recently renewed – natural
Availability Indicator	A	=> available

Stand Type: 40 Protection Site

The intent of this stand type code is to represent productive forest areas on which forest management activities cannot normally be practised without incurring deleterious environmental effects because of obvious physical limitations. The stocking in these stands can be at any level (less than, equal to, or greater than 30%).

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	PF	=> protection forest
Age Structure Indicator		***select one, as appropriate:***
	E	=> even aged ***(default)***
	U	=> uneven aged
Stage of Development	FTGN	=> free-to-grow / free growing - natural
Management Consideration		***select one, as appropriate:***
	U_PF	=> unknown – PF (***default***)
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> telluric/highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	NONE	=> no access considerations

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
	SE	=> selection
Silvicultural Intensity	PRSNT	=> present
Stage of Management	FTGN	=> FTG/FGWS - natural
Availability Indicator	U	=> unavailable (normally)

Stand Type: 41 Protection Island

The intent of this stand type code is to represent productive forest areas on which forest management activities cannot normally be practised without incurring deleterious environmental effects because of obvious physical limitations AND has an access restriction (it is an island).

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	FOR	=> productive forest
Productive Forest Modifier	PF	=> protection forest
Age Structure Indicator		***select one, as appropriate:***
	E	=> even aged ***(default)***
	U	=> uneven aged
Stage of Development	FTGN	=> free-to-grow / free growing - natural
Management Consideration		***select one, as appropriate:***
	U_PF	=> unknown – PF ***(default)***
	SOIL	=> shallow soils
	ROCK	=> exposed bedrock / rocky outcrops
	SAND	=> blow/exposed sand, shallow or no humus
	STEP	=> steep slopes
	WATR	=> tellluric / highly fluctuating, moving ground water
	WETT	=> poorly drained – high water table
	DAMG	=> physical/natural disturbance/damage
	POOR	=> stagnated, poor tree growth; no indicator
	COLD	=> permafrost
	OTHR	=> other – specify
Accessibility Indicator	ISL	=> island

Stand Type: 41 (cont'd)

Additional Attributes for the Planning Inventory Only

Attribute	Value	Comment/Definition
Silvicultural System		***select one, as appropriate:***
	CC	=> clearcut
	SH	=> shelterwood
	SE	=> selection
Silvicultural Intensity	PRSNT	=> present
Stage of Management	FTGN	=> FTG/FGWS - natural
Availability Indicator	U	=> unavailable (normally)

Stand Type: 50 Forested Treed Muskeg

The intent of this stand type code is to represent non-productive, forested areas that are dry or wet muskeg on which stunted trees occur as widely scattered individuals or in small groups.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	TMS	=> treed muskeg

There are no additional attributes for the Planning Inventory.

Stand Type: 52 Forested Open Muskeg

The intent of this stand type code is to represent non-productive, forested stands that are wet areas of mosses, grasses, sedges, and small herbaceous plants, often interspersed with small areas of open water.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	OMS	=> open muskeg

There are no additional attributes for the Planning Inventory.

Stand Type: 54 Brush and Alder

The intent of this stand type code is to represent non-productive, forested stands that are currently covered with non-commercial tree species. These areas often border streams, lakes, or non-perennial streams and may be subjected to periodic flooding.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	BSH	=> brush and alder

There are no additional attributes for the Planning Inventory.

Stand Type: 56 Forested Rock

The intent of this stand type code is to represent non-productive, forested stands characterized as areas of barren rock (bedrock, a cliff face, or talus slope) which may support a few scattered trees and is less than 30% stocked.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	RCK	=> rock

There are no additional attributes for the Planning Inventory.

Stand Type: 60 Non-Forested, Developed Agriculture Land (DAL)

The intent of this stand type code is to represent non-forested areas that are cultivated lands that produce farm crops or are devoted to market gardens, orchards, etc.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	DAL	=> developed agriculture land

There are no additional attributes for the Planning Inventory.

Stand Type: 63 Non-Forested, Grass and Meadow

The intent of this stand type code is to represent non-forested areas devoted to pasture for domesticated animals. This type of area can be recognized by fences, row trees fallen on the area, or scattered trees growing over parts of a field. Grass and meadow areas are similar to barren and scattered areas but are usually found near developed agriculture land or unclassified areas and are usually fenced.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	GRS	=> grass and meadow

There are no additional attributes for the Planning Inventory.

Stand Type: 66 Non-Forested, Unclassified (UCL)

The intent of this stand type code is to represent any area not clearly defined by the other stand type classifications. This includes municipalities, roads, railroads, mines, logging camps, gravel pits, transmission lines, etc.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	UCL	=> unclassified

There are no additional attributes for the Planning Inventory.

Stand Type: 70 Water

The intent of this stand type code is to represent bodies of water (e.g., lakes, rivers, ponds, reservoirs).

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	WAT	=> water

There are no additional attributes for the Planning Inventory.

Stand Type: 71 Two-Sided River

The intent of this stand type code was to represent rivers or streams that can be defined by area (versus a line). Generally, these rivers/streams are consistently wider than 20 meters when portrayed at a mapping scale of 1:10,000 or consistently wider than 40 meters when portrayed at a mapping scale of 1:20,000. Smaller/narrower rivers and streams are maintained as linear features in a centre-line coverage(s)

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	WAT	=> water

There are no additional attributes for the Planning Inventory.

Stand Type: 80 (Unsurveyed)

The intent of this stand type code is to represent areas of a known location, but where the description of the area is not known (i.e., areas that have not been photographed, interpreted, or field surveyed). Unsurveyed areas are no longer acceptable in the FIM.

Required Attributes for the Stewardship and Planning Inventories

Attribute	Value	Comment/Definition
Polygon Type	UNS	=> unsurveyed

There are no additional attributes for the Planning Inventory.